2023160781

PHILIP MORRIS PRODUCTS INC

INTER-OFFICE CORRESPONDENCE

Richmond, Virginia

To: Don Leyden **Date:** February 20, 1992

From: R. S. Slagle

Subject: OPERATIONAL PLANS

Attached, please find the 1992 Operational Plans for International Product Development (Export Products).

RSS:da

Attachment

cc: A. H. Confer
R. P. Heretick
J. L. Myracle
H. L. Spielberg

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STRATEGIC GOAL #1

Export Product Standardization

Objective : To standardize tobacco filler OV specifications for export products by determining the need for the existence of tropical filler specifications (OV) for products exported to those regions designated tropical. A recommendation for the tropical filler specifications will be made 2nd Qtr., 1992.

Explanatory Introduction:

At the present time, tropical filler is used on 38 brands and is sent to 28 export formula destinations. The purpose of this experiment is to examine the effect of time and temperature on the physical and subjective integrity of the products selected for this study.

Strategy : Cigarettes made to tropical and non-tropical formulations were made in the factory, monitored through transport from Richmond to Singapore and analyzed in Singapore for physical and subjective changes. A similar test plan, with tropical and non-tropical formulations, is planned for the UAE; therefore, information will be available to evaluate how the test products reacted under both extreme climatic conditions.

Requirements	Timetable	Resources
Singapore		
Spotting and Staining (QA) and CI analyses for final phase of Singapore study	March, 1992	Pillow, Graff, Chambers, Tierney
UAE		
Cigarettes loaded onto vessel	February 6, 1992	Graff, Tierney, Maersk personnel
Arrival in UAE	March 11, 1992	Sadaoui, Tierney, Mobrem
Initial spotting and staining and downloading of hamster data and retrieval of samples for analysis in US	March 20, 1992	Sadaoui, Tierney, Mobrem

Requirements (cont'd.)	Timetable	Resources
On-site spotting and staining analyses; retrieval of hamster data and units, shipment of samples to U.S. for spotting and staining (QA) and CI analyses.	April 30, 1992	Sadaoui, Tierney, Mobrem
Recommendation for Tropical Filler Specifications	2nd Qtr., 1992	Tierney, Graff

STRATEGIC GOAL #2

Product Launches for GCC

Objective : To develop new cigarette products for the GCC export market which will contribute to our growth in this marketplace.

Explanatory Introduction:

Saudi Arabia has experienced an increased amount of oil workers from the Philippines. Philip Morris Menthol 100mm SP was developed to attract smokers from the Philippines who are familiar with this product presently manufactured in La Suerta. Merit Ultra Special KS FTB is being developed to respond to the growth of the low tar segment in the GCC and to compete with Barclay Ultra. Chesterfield KS FTB and Chesterfield Lights KS FTB are being developed to combat Lucky Strike and head off its potential growth in the GCC.

Strategy : To develop new cigarette products that meet EEMA's planned product introductions. The following lists the planned introductions:

	Market Introduction Date
PM Menthol 100 SP	February, 1992
Merit Ultra Special KS FTB	September, 1992
Chesterfield KS FTB	May, 1992
Chesterfield Lights KS FTB	May, 1992

Tactics & Timetable:

Requirements	Timetable	Resources
PM Menthol 100 SP		
Prototype Development Work	July, 1991	Tierney, Hoskin, Chambers
Factory Trial - Cabarrus	September, 1991	Sealey, Thompson
Factory Trial - Stockton Street	November, 1991	Tierney, Thompson
Production Start-up	December, 1991	Tierney, Jones
Market Introduction Date	February, 1992	EEMA
Merit Ultra Special KS FTB		
Prototype Development Work (Domestic Product Development)	1991-1992	Arterbery, Tierney
CPC	February, 1992	Greher, Stathapoulos
Launch	September, 1992	EEMA

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Requirements (cont'd.)	Timetable	Resources
Chesterfield KS FTB		
CPC Submission	February, 1992	Greher, Stathopoulos
Development Work	February, 1992	Tierney, Hoskin, Chambers
Factory Trial	March, 1992	Tierney
Production Start-up	March, 1992	Tierney
Market Launch	May, 1992	EEMA
Chesterfield Lights KS FTB		
CPC Submission	February, 1992	Greher, Stathopoulos
Prototype Development Work	February, 1992	Tierney, Hoskin
Factory Trial	March, 1992	Tierney
Production Start-up	March, 1992	Tierney
Market Launch	May, 1992	EEMA

STRATEGIC GOAL #2

Product Launches for Iran

Objective : To develop new cigarette products for the Iran export market which will contribute to our growth in this marketplace. Product specifications will be modified in anticipation of printed T&N requirement. All merit products will reflect GCC T&N targets.

Explanatory Introduction:

The Merit Ultra Lights KS FTB and Merit 100mm SP are being launched to compliment the Merit Brand family (Merit Ultra Lights KS SP and Merit KS SP) originally launched second quarter 1991 in Iran. These two launches scheduled for February, 1992 will increase PM's presence and overall market share in this region.

Strategy : To develop new cigarette products that meet EEMA's planned product introductions. The following lists the planned introductions:

	Market Introduction Date
Merit Ultra Lights KS FTB	January, 1992
Merit 100mm SP	January, 1992
Tar/nicotine values printed	TBD*

Tactics & Timetable:

Requirements	Timetable	Resources
Merit Ultra Lights KS FTB		
Prototype Development Work	December, 1991	Tierney, Hoskin, Chambers
Factory Trial	December, 1991	Tierney, Thompson
Production Start-up	January, 1992	Tierney, Thompson
Market Introduction Date	February, 1992	EEMA
Merit 100mm Regular SP		
Prototype Development Work	December, 1991	Tierney, Hoskin, Chambers
Factory Trial	December, 1991	Tierney, Thompson
Production Start-up	December, 1991	Tierney, Thompson
Market Introduction	February, 1992	EEMA

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Requirements (cont'd.)	Timetable	Resources
Printed T/N Numbers Required on Pack		
Modify products to conform to printed pack numbers	January, 1992	Tierney, Haywood, Fuss
Production Start-up	TBD*	Tierney, Thompson
Market Introduction with new packaging	TBD*	EEMA

* Pending regional requirement for printed T&N figures.

STRATEGIC GOAL #2

Product Launches for Israel

Objective : To develop new cigarette products for export to Israel which will contribute to our growth in the market.

Explanatory Introduction:

The conversion of Parliament LS to KS is keeping with the trend internationally to me box products from 80 to 83mm. The Parliament Lights 100 SP introduction is targeted to increase brand's competitiveness and rejuvenate the franchise. If the introduction of Parliament Lights 100 SP proves successful, the box version may be phased out since Israel is predominantly a soft pack market.

Strategy : To develop new cigarette products that meet EEC planned product introductions. The following lists the planned introductions:

	Market Introduction Date
Parliament LS → KS FTB Conversion	February, 1992
Marlboro Lights 100 SP	March, 1992
Marlboro 100 SP	March, 1992
Parliament Lights 100 SP	March, 1992

Tactics and Timetable:

Requirements	Timetable	Resources
Parliament LS → KS FTB Conversion		
Specification Letter Written	January, 1992	Graff
Market Introduction	February, 1992	

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Requirements (cont'd.)	Timetable	Resources
Marlboro Lights 100 Soft Pack		
CPC	August, 1991	
Specification Letter Written	September, 1991	Graff
Market Introduction	Project Frozen	
Marlboro 100 SP		
Specification Letter Written	September, 1991	Graff
Market Introduction	Project Frozen	
Parliament Lights 100 SP		
CPC Approval	November, 1991	
Specification Written	January, 1992	Graff
Factory Trial	TBD	Graff, Thompson
Market Introduction	March, 1992	

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STRATEGIC GOAL #2

Product Launches for Lebanon

Objective : To develop new cigarette products for the Lebanon "Domestic" export market which will contribute to our growth in this marketplace.

Explanatory Introduction:

PM Filter Kings SP and FTB have been identified to combat Winston's growth. These brands will establish PM's presence in the high price segment and increase PM's overall market share.

Strategy : To develop new cigarette products that meet EEMA's planned product introductions. The following lists the planned introductions:

	Market Introduction Date
PM Filter Kings (Johnny Pack)	April, 1992

Tactics & Timetable:

Requirements	Timetable	Resources
PM Filter Kings (Johnny Pack)		
CPC Submission	January, 1992	Tierney, Stathopoulos, Greher
Prototype Development Work	January, 1992	Tierney, Hoskin, Chambers
Factory Trial	February, 1992	Tierney, Thompson
Production Start-up	February, 1992	Tierney, Thompson
Market Introduction	April, 1992	EEMA

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STRATEGIC GOAL #2

Product Launches for Thailand

Objective : To develop new cigarette products for export to Thailand which will contribute to our growth in the market.

Explanatory Introduction:

The Marlboro KS FTB and Parliament 100 FTB are being launched to compliment the Marlboro and Parliament families. These two launches scheduled for 1992 will increase PM's presence and overall market share in this region.

Strategy : To develop new cigarette products that meet planned product introductions. The following lists the planned introductions:

	Market Introduction Date
Marlboro KS FTB	April, 1992
Parliament 100 FTB	November, 1992

Tactics and Timetable:

Requirements	Timetable	Resources
Marlboro KS FTB		
CPC Approved	October, 1991	
Write specification letter	January, 1992	Graff
Market Introduction	April, 1992	
Parliament 100 FTB		
Factory Trial	TBD	Graff, Thompson
Production Start-up	TBD	Graff, Thompson
CPC	March, 1992	
Market Introduction	November, 1992	

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STRATEGIC GOAL #2

L&M/Chesterfield Production Consolidation

Objective : To standardize L&M/Chesterfield fillers used for export to various regions.

Explanatory Introduction:

Currently, there are ne separate cut filler specifications which may be reduced to three. This may result in approximately $750,000 a year in cost savings. A recommendation for the possible consolidation will be made second quarter of 1992.

Strategy : Both the current L&M export and Chesterfield exports will be made, along with the existing Marlboro blend and Marlboro casing and L&M aftercut, Marlboro blend with Marlboro casing and Chesterfield aftercut and Benson & Hedges. Models will be subjectively evaluated by the Richmond Panel.

Tactics and Timetable:

Requirements	Timetable	Resources
Prototype Development Work	January, 1992	Graff, Hoskin, Chambers
Richmond Panel Evaluation	February, 1992	Graff, Heretick
Consolidation Recommendation	2nd Qtr., 1992	Graff, Confer, Heretick
Implementation	3rd Qtr., 1992	Graff Thompson

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STRATEGIC GOAL #2

Parliament - Turkey

Objective : To determine the control of dilution of Parliament 100 SP by pre-perforating the filter rod and incorporating a pre-perforated tipping paper during cigarette manufacture.

Explanatory Introduction:

An alternate method of achieving the desired dilution is to pre-perforate the filters and controlling the overall cigarette dilution with pre-perforated tipping paper.

Strategy : Samples will be manufactured, using the standard laser method of perforation in addition to pre-perforated filters and tipping papers to evaluate the effectiveness of pre-perforated filters.

Tactics and Timetables:

Requirements	Timetable	Resources
Preliminary Factory Trial	January, 1992	Graff, Thompson
Prototype Development	1st Qtr., 1992	Graff, Hoskin
Richmond Panel Evaluation	2nd Qtr., 1992	Graff, Heretick
Recommendation	2nd Qtr., 1992	Graff

STRATEGIC GOAL #2

New Product Launches for Hong Kong, Macau, Guam, Taiwan, and US Duty Free

Objective : To coordinate new product launches for the international export markets of Hong Kong, Guam, Taiwan, Macau, and US Duty Free which should continue to increase our market share in these regions.

Explanatory Introduction:

In Hong Kong in 1991, PM Products experienced better than 42% share of market. The introduction of these new brands and line extensions should insure an increase in market share in Hong Kong and other Eastern markets.

Strategy : The 1992 planned new product launches for Hong Kong, Guam, Taiwan, US Duty Free, and Macau have been outlined in the U.S. Export Product Plan. Some of these represent line extensions of existing products. Specifications will be issued to accomodate the planned launch dates.

Tactics and Timetable:

The Marlboro Medium KS S/P for Hong Kong and Macau will be subjectively evaluated on the Hong Kong Consumer Panel in April. The B&H Deluxe Lights 100's FTB for Taiwan will be subjectively evaluated on PMI Panel vs. YSL. New product specifications will be written in advance to facilitate the introduction and launch of these product line extensions. The timetable for this is listed below:

Country	Brand	Spec. Due	Launch Date
Hong Kong/Macau	Marl. Med. KS S/P	Aug., 1992	Oct., 1992
Guam	Marl. Lights KS FTB	Jan., 1992	March, 1992
	Va. Slims Super. 100 FTB	Jan., 1992	March, 1992
	Va. Slims Super. Men. 100 FTB	Jan., 1992	March, 1992
	B&H 100 Men. FTB	Feb., 1992	April, 1992
Taiwan	Parl. KS FTB	Jan., 1992	March, 1992
	Marl. 100's FTB	Feb., 1992	April, 1992
	B&H Del. Lts. 100's FTB	May, 1992	July, 1992
	Marl. KS FTB 10's	Aug., 1992	Oct., 1992
	Marl. KS FTB (Duty Free)	Oct., 1992	Dec., 1992
U.S. Duty Free	Marl. Men. KS FTB	Jan., 1992	March, 1992
	Marl. Lts. KS FTB 300 ctn.	Jan., 1992	March, 1992
	Marl. Med. KS S/P	April, 1992	June, 1992
	Marl. Med. 100's FTB	April, 1992	June, 1992
	Parl. Del. 100's S/P	April, 1992	June, 1992

Resources:

Specifications	Easley
Cigarette Testing	Chambers
Flavor Development Panel	Parrish
Richmond Panel	Heretick
Consumer Panel	Matthews

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STRATEGIC GOAL #2

Virginia blended product (Project Hilda) for Taiwan

Objective : To assist in the design, development, consumer testing and launch of a Virginia blended cigarette to be introduced in Taiwan.

Explanatory Introduction:

In the Taiwan market Virginia cigarettes make up 90% of the sales, whereas PM products only represent 6% of this total. This introduction of a Virginia product is an attempt to increase PM's share in the Virginia dominated market in Taiwan.

Strategy : Product development work will be conducted in PM Australia during the first quarter of 1992. Three PMI product tests will be performed during the second quarter of 1992 to determine consumer preferences of the Hilda prototype. The three tests planned are:

a) Hilda w/white tip vs. Long Life Milds
b) Hilda w/cork tip vs. State Express 555
c) Hilda w/cork tip vs. Hilda w/white tip

Test cigarettes will be sent to Richmond for overtipping and shipping of final test product.

Tactics and Timetable: The following timetable will be followed:

Development of prototypes - PM Australia	- Jan. '92
Shipment of prototypes & competitor's brands to Richmond	- Feb. '92
Ringtipping, shipment of final test product to Taiwan	- Mar. '92
Analytical & subjective evaluations (Richmond Panel/Flavor Tech./CTS)	- Mar. '92
Consumer testing in Taiwan	- 2nd Qtr. '92
Analyzing results, final specifications, production start-up in Australia	- 3rd Qtr. '92
Brand launch in Taiwan	- Oct. '92

Resources :

Prototype Production	PM Australia
Overtipping	Semiworks
Analyticals	Chambers
Flavor Development Panel	Parrish
Richmond Panel	Heretick

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STRATEGIC GOAL #2

Merit KS for Hong Kong

Objective : To introduce Merit KS FTB in the Kong Kong market during the third quarter of 1993.

Explanatory Introduction:

Kent represents more than 10% of sales in Hong Kong. A Merit KS product with a single digit tar delivery, that would appeal to Kent smokers, has been a development objective of PM Asia for several years.

Strategy : Conduct flavor work, blend work, and prototype production during 1992 to anticipate this possible introduction for 1993.

Tactics and Timetable:

Development work should begin in the 2nd Qtr., 1992 with consumer panel evaluation during early 1993.

Prototype production for flavor development - I	- Apr.'92
Flavor development - Phase I	- June '92
Prototype production - Phase I	- July '92
Internal subjective/analytical evaluations	- Aug. '92
Prototype production for flavor development - II	- Sept.'92
Flavor development - Phase II	- Nov. '92
Prototype production - Phase II	- Dec. '92
Internal subjective/analytical evaluations	- Jan. '93
HKCP test recommendations	- Jan. '93
Possible HKCP test production/analytical/subjectives	- TBD

Resources :

Prototype Production	Semiworks
Flavor development	Parrish
Analytical Evaluation	Chambers
Flavor development panel	Parrish
Consumer Panel	Matthews
Richmond Panel	Heretick
Specifications	Easley

STRATEGIC GOAL #2

Existing Product Support/Packaging Revisions

Objective : To develop packaging revisions to anticipate international consumer trends and help provide a marketing advantage.

Strategy : The following is a listing of 1992 planned packaging revisions which have been outlined in the US Export Product Plan for 1992-1994:

Country	Brand	Launch Date
Taiwan Duty Free	Parliament 100's FTB Graphics Change	2/15/92
Taiwan Domestic	Va. Slims Lights 100's FTB Menthol	7/15/92
Duty Free Sales USA	Va. Slims Lights 100's FTB	3/1/92
	Va. Slims Superslims 100's FTB	3/1/92
	Va. Slims Ultra Light 100's FTB	3/1/92
	Va. Slims 100's Menthol S/P	3/1/92
	Va. Slims 120's FTB	3/1/92
	Va. Slims 120's FTB Menthol	3/1/92
	Marlboro Lights KS FTB Jumbo Carton	3/1/92
	Va. Slims Lights 100's FTB Menthol	3/1/92
	Va. Slims Superslims 100's FTB Men.	3/1/92
	Va. Slims Ultra Lights 100's FTB Men.	3/1/92

Timetable : Packaging changes will be conducted in a manner in which obsolescence can be minimized and to accommodate the proposed launch dates.

Existing Product Support/Health Warning Requirement

Objective : To monitor the addition of the US Health warning notice to all export packs that do not presently carry any other country's health warning.

Strategy : There are 184 export packings affected. A random rotation of the four US warning notices will be used. Printed materials will be converted as each item is used up to avoid as much obsolescence as possible.

Timetable : Preparations began in January to implement this program with target phase-in beginning April 1, 1992 and with completion slated for the end of 1992.

STRATEGIC GOAL #3

Product Technology/Consumer Research

Objective : Conduct PMI consumer tests for Taiwan to maintain and/or enhance the subjective, analytical and physical performance of existing products in the marketplace.

Strategy : Five PMI tests have been tentatively planned for Taiwan during 1992. These tests are:

Brand	Fieldwork (tentative)
L&M FF Charcoal vs. non-charcoal	Feb. '92
L&M (11mg) Charcoal vs. non-charcoal	Feb. '92
VSLM vs. YSL Menthol	Feb. '92
Parl. KS vs. Mild Seven Light	March '92
Parl. KS vs. Marlboro Lights	March '92

Tactics and Timetable:

After Market Management has decided on tests and the schedules are in place, these tests will be produced and shipped to meet the appropriate fieldwork dates.

Product Technology/Marlboro Monitors

Objective : Conduct consumer tests in Hong Kong with Marlboro versus competitor's cigarettes to monitor the quality and consumer preference of our brands.

Strategy : Two Marlboro tests are proposed for PMI testing in 1992. These tests are:

Marlboro Red vs. Winston Red - Aug. '92
Marlboro Lights vs. Kent - Aug. '92

Tactics and Timetable:

These tests will be coordinated and shipped in time to meet the established fieldwork dates.

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STRATEGIC GOAL #2

Lark Combining Wrap

Objective : Reduce ventilation variability and increase potential for higher mean ventilation by replacing current mechanically perforated combining wrap with an inherently porous wrap on Lark products. A combining wrap supplied by one vendor with these properties is to be specified by 1st quarter, 1992.

Explanatory Introduction:

Mechanically perforated combining wraps have two short-comings; the variation in product ventilation and an inability to achieve higher mean levels required in lower tar products. Inherently porous combining wraps positively address these areas of concern.

Strategy : Models from two vendors are under evaluation. Kimberly-Clark has two paper porosities with their "dot matrix" application and Ecusta has one paper with the diagonal hotmelt pattern. Each of these vendors has shown their product improves mean ventilation and reduces ventilation variability. However, because the papers are unlike that currently used, challenges remain in successfully combining a filter and tipping a cigarette to the quality level of the control.

Tactics and Timetable:

Factory trial	January, 1992
Analytical smoking	January, 1992
Richmond Panel approval	February, 1992
QE evaluation of filters and cigarettes	February, 1992
2nd factory trial on recommended refinements	February, 1992
Vendor selection	March, 1992
Product specification w/porous combining wrap on Lark Super Lights	March, 1992
Expansion to all Lark products	June, 1992

Resources :

R&D Export Product Development	R. Lambert
R&D Filter Development	D. Laslie/K. Newman
Manufacturing Services	C. Jackson/E. Weston
Quality Engineering	J. Calloway
R&D Semiworks	J. Warren

Resources : (cont'd.)

Quality Assurance	V. Bell
Purchasing	B. Johnson
R&D Cigarette Information	L. Chambers
R&D Product Evaluation	C. Matthews
R&D Flavor Technology	K. Parrish

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STRATEGIC GOAL 2

Carbon Consolidation - Coal Based

Objective : Eliminate iron and zinc impregnants in SCCW carbon which is used in Lark plug space plug filter products by the 1st quarter, 1992.

Explanatory Introduction:

Due to the introduction of ventilation in our products, iron and zinc salt impregnation is no longer needed to reduce specific gas phase components in smoke. Elimination of these impregnants will also result in a projected annual cost savings of $800,000. Impregnant removal will align this carbon for future consolidation of all carbon filter products to one specification (PM Specification coconut based carbon).

Strategy : Consumer testing in Japan and internal testing have shown no subjective difference between Lark products with or without the impregnants in the carbon. The major obstacle in qualifying the non impregnated carbon has been the observation of increased dust generation at the filter combiner. After making these concerns known to Calgon, adjustments have been made in their processing to remedy this dusting.

Tactics and Timetable:

Carbon analysis	April, 1990
Model production	April, 1990
Analytical smoking	April, 1990
Richmond Panel approval	April, 1990
Danchi Panel consumer testing	May & October, 1990
Short term trial (10 drums)	November, 1991
Long term trial (60 drums)	January, 1992
Extended trial (160 drums)	February, 1992
Product specification & implementation	March, 1992
Consumer testing of one carbon specification	December, 1992

Resources :		
	R&D Export Product Development	R. Lambert
	R&D Filter Development	A. Finley
	Manufacturing Services	C. Jackson/J. Horne
	Quality Assurance	V. Bell
	Purchasing	B. Johnson
	R&D Cigarette Information	L. Chambers
	R&D Product Evaluation	C. Matthews

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Resources	:	(cont'd.)	
		Manufacturing	M. Brown/W. Roarke
		R&D Semiworks	J. Warren
		R&D Flavor Technology	K. Parrish

STRATEGIC GOAL 2

Carbon Consolidation - Coconut Based

Objective : Establish one PM specification for coconut based carbon by June, 1992. Longer term, one specification is desired for all carbon filter applications.

Explanatory Introduction:

Two different coconut carbon specifications currently exist for dual filter manufacturing. One of these specifications will be eliminated but vendor volume mix, currently in place, will be unaffected.

Strategy : The current specification for Pica RC 328 has been slightly modified, resulting in a PM specification, which is the desired coconut carbon for consolidation. Smaller volume brands which used Calgon MF2C (Lark Deluxe, Multifilter, Virginia Slims 100 for Japan) have been changed to the desired specification based upon internal subjective evaluation. Because of the significant volumes, Parliament 100 has undergone three Danchi panel evaluations of the PM specification carbon. POL testing of a Parliament 100 will take place during March-April, 1992.

Tactics and Timetable:

Carbon analysis	September, 1991
Analytical smoking	October, 1991
Richmond Panel approval	October, 1991
Danchi Panel consumer testing	November, 1991/February, 1992
POL consumer testing	March-April, 1992
Product specification & implementation	June, 1992

Resources :

R&D Export Product Development	R. Lambert
R&D Domestic Product Development	D. Atkinson
R&D Filter Development Group	A. Finley
Manufacturing Services	C. Jackson/A. Utz
R&D Semiworks	J. Warren
Quality Assurance	M. S. Schreck
Purchasing	B. Johnson
Manufacturing	R. Sauls
R&D Product Evaluation	C. Matthews
R&D Flavor Technology	K. Parrish
R&D Cigarette Information	L. Chambers

STRATEGIC GOAL 2

Lark Family Tar Reduction

Objective : Position the Lark family of products so they will benefit from the downward trend of tar level observed in the Japanese marketplace.

Explanatory Introduction:

Reduced tar Lark products are being developed and will be implemented in order to improve ratings and sales among mainstream Japanese smoker groups, while not alienating current Lark family smokers.

Strategy : The following is a listing of Lark family current and proposed tar levels:

Lark FF KS	15——14
Lark FF 100's	15——14
Lark Milds KS	11——10
Lark Milds 100's	12——10
Lark Super Lights	8—7—6

This reduction program has been requested by PMKK and will be implemented as soon as possible, such that all products arriving in Japan in May, 1992 will be the reduced tar versions.

Tactics and Timetable:

Lark Super Lights 7mg	January, 1992
Factory trials	February, 1992
Analytical smoking	February, 1992
Subjective smoking	February, 1992
Specification issue and implementation for Lark KS, Lark Milds 100, & Lark 100	February, 1992
Specification issue for Lark Milds and Lark Super Lights	March, 1992
All products in port	May, 1992
All products in retail	July, 1992

Resources :

R&D Export Product Development	R. Lambert
Manufacturing Services	K. Thompson
Quality Assurance	V. Bell/D. Taylor
Quality Engineering	J. Calloway

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Resources : (cont'd.)

Manufacturing	M. Brown/J. Glenn/K. Parrish
R&D Cigarette Information	L. Chambers
R&D Product Evaluation	C. Matthews
R&D Flavor Technology	K. Parrish

STRATEGIC GOAL 2

Lark Packaging

Objective : The Lark product line will undergo a graphics revision which is to be completed by July, 1992.

Explanatory Introduction:

Along with proposed printed tar and nicotine changes, graphics for all Lark packaging will be revised.

Strategy : The graphics change will begin in April, 1992 and totally implemented by July, 1992. This effort will be managed in conjunction with the tar reduction program. Each of these changes is intended to improve Lark sales in Japan which have recently been stagnant.

Tactics and Timetables:

Begin implementation	April, 1992
Graphics revision completed	July, 1992

Resources :	R&D Export Product Development	R. Lambert
	Purchasing	M. Pollio
	Production Planning	W. Isbell
	Manufacturing Services	R. Street

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STRATEGIC GOAL 2

Marlboro LS to KS FTB Conversion

Objective : Existing Marlboro FF products in 80mm LS FTB are being converted to 83 mm KS FTB worldwide. All new to market introductions of this product line will be in the 83mmmKS FTB format. Specifications will be in effect for all regions (Asia and EEMA) by June, 1992.

Explanatory Introduction:

All Marlboro FF Box packagings will be in the 83 mm KS format. The 80mm FTB box will no longer be produced for the Asia or EEMA regions.

Strategy : Issue of specifications began in 1991 for the Asia region. Specifications will be issued for EEMA by June, 1992. In most cases, the product is the standard specification. Separate specifications are issued in instances of tar limitations or smoking methodologies other than FTC.

Tactics and Timetables:

Asia region specifications	January, 1992
EEMA region	June, 1992

Resources :		
	R&D Export Product Development	R. Lambert
	Purchasing	B. Bjorkholm
	Manufacturing Services	J. Ellis
	Production Planning	W. Isbell

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STRATEGIC GOAL 2

Lark Line Extension

Objective : Position a Lark family product between existing packagings which will have appeal to the mainstream Japanese consumer. Also develop a plug space plug product in the 4 mg tar category.

Explanatory Introduction:

Recent product testing in Japan has shown the Japanese Marlboro product may be the appropriate direction for attracting new smokers in that market (Mild Seven/Mild Seven Lights).

Strategy : Models have been made at 10, 8, and 6mg TIOJ levels with Lark and U. S. Marlboro flavors on a "Marlboro Japan-like" blend. All models use the Lark plug space plug filter system. The 4 mg product is under development. Purchased filters may be required if plug space plug is the desired system.

Tactics and Timetable:

Prototype design 10-6 MG ONLY	January, 1992
Model production	January, 1992
Prototype refinement	February, 1992
Model production	February, 1992
Analytical/subjective evaluations	March, 1992
Danchi Panel	March, 1992
Test results & recommendation	May, 1992
Prototype design 4 MG ONLY	February, 1992
Filter procurement	March, 1992
Model production	April, 1992
Analytical/subjective	April, 1992
Model recommendation	May, 1992

Resources :

Export Product Development	R. Lambert
Flavor Technology	K. Parrish
Leaf	C. Brumberg
R&D Semiworks	J. Warren
R&D Product Evaluation	C. Matthews
R&D Cigarette Information	L. Chambers
Purchasing	M. Pollio

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STRATEGIC GOAL 2

PM Engineering High Speed Combiner

Objective : PM Engineering is planning to build a plug space plug combiner which will more than double current machine speeds. Testing of this prototype machine is to take place this year.

Explanatory Introduction:

In order to increase Lark filter combining capacity, PM Engineering will begin evaluation of high speed combiners.

Strategy : Lines of communication have been established with Engineering to make them aware of product changes which may impact combiner requirements. Product Development will support Engineering efforts through facilitating the development of high-speed machinery which produces filters that are analytically and subjectively equivalent to the existing product.

Tactics and Timetables:

Engineering machine development	June, 1992
Combiner prototype available	December, 1992

Resources	:	R&D Export Product Development	R. Lambert
		Engineering	M. Garthaffner
		Manufacturing Services	K. Thompson

STRATEGIC GOAL 2

Optimization of Parliament Filter Design

Objective : Optimize filtration efficiency in Parliament dual filter products by December, 1992.

Explanatory Introduction:

Parliament filter design should be optimized to provide for more efficient tar and nicotine removal. As part of this optimization process, attention should be paid to areas where filter component and filter tow consolidation might be appropriate.

Strategy : Parliament filters will be analyzed to determine how filtration efficiencies may be maximized. All products will be modeled with the inner component being the more efficient. This will allow for less reliance on higher ventilation which is difficult to obtain with current generation Max S lasers.

Tactics and Timetables:

Model recommendations	May, 1992
Factory trials	June, 1992
Analytical evaluations	June, 1992
Subjective evaluations	June, 1992
Phase II factory trials	July, 1992
Analytical evaluations	August, 1992
Subjective evaluations	August, 1992
Final recommendations	October, 1990

Resources :		
	Export Product Development	R. Lambert/D. Sealey
	Manufacturing Services	C. Jackson
	R&D Cigarette Information	L. Chambers
	Flavor Technology	K. Parrish
	Purchasing	B. Johnson
	Manufacturing	R. Sauls

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STRATETIC GOAL 2

Tar Reduction L&M Milds

Objective : Reduce the tar from 11 to 10 mg TIOJ on the L&M Milds product.

Explanatory Introduction:

Based upon the decline of the Japanese sales weighted tar average this product will be placed in the 10 mg tar category.

Strategy : Position this product at a lower tar target which is reflective of the lower tar expectations of the Japanese market. This tar reduction will be effected by increasing filtration efficiency.

Tactics and Timetables:

Model making in Semiworks	February, 1992
Analytical/subjective evaluations	March, 1992
Factory trial	March, 1992
Specification issue	April, 1992

Resources	: Export Product Development	R. Lambert
	R&D Cigarette Information	L. Chambers
	Flavor Technology	K. Parrish
	Manufacturing Services	E. Weston
	R&D Semiworks	J. Warren

2023160813

STRATEGIC GOAL 2

PM Super Lights KS & 100 Tar Reduction

Objective : Reduce tar from 8 to 7 mg TIOJ on the PM Super Lights KS and 100 mm products.

Explanatory Introduction:

Reposition brand family to reflect the decline of the Japanese sales weighted tar average.

Strategy : Models have been produced for the KS product. Initial modelling has taken place to begin tar reductions for the 100mm product.

Tactics and Timetables:

Models for 7mg KS product	December, 1991
Prototypes for 100's product	February, 1992
Analytical/subjective work	March, 1992
Discussions with FIL if filter work needed	March, 1992
Factory trial	March, 1992
Specification issue	April, 1992

Resources	: Export Product Development	R. Lambert
	R&D Filter Development	K. Newman
	R&D Semiworks	J. Warren
	Manufacturing Services	E. Weston
	R&D Cigarette Information	L. Chambers
	Flavor Technology	K. Parrish

STRATEGIC GOAL 2

Lotus/Ambrosia

Objective : Introduce products to the Japanese market which exhibit 70% sidestream reduction versus Mild Seven. Products may also be characterized as having a distinctive or neutral odor.

Explanatory Introduction:

To be prepared for consumer demand, products will continue to be developed which exhibit reduced sidestream characteristics along with additives which have either neutral or distinctive odor.

Strategy : Consumer testing has been conducted in Japan on reduced sidestream papers. Model development continues using latest generation of MAGIC binary and ternary papers. These papers are designed to address some of the subjective shortcomings associated with magnesium hydroxide and other higher basis weight sheets. Studies have been conducted at Peryam & Kroll to characterize sidestream from Japanese products.

Tactics and Timetables:

Danchi panel (Magnesium hydroxide papers)	February, 1990
Peryam & Kroll studies of Japanese brands	February, 1992
Models with MAGIC papers	May, 1991
Projected introduction in Japan	1993

Resources :		
	Export Product Development	R. Lambert
	R&D Paper Development	G. Bokelman/S. Tafur
	R&D Flavor Development	K. Parrish
	R&D Semiworks	J. Warren
	R&D Cigarette Information	L. Chambers
	R&D Domestic Product Development	D. Newman
	R&D Product Evaluation	C. Matthews

STRATEGIC GOAL 3

Va. Slims 6.0mg product for Korea

Objective : Develop a Va. Slims 6.0mg product for the Korean marketplace.

Explanatory Introduction:

Models have been produced @ 8.0mg for the Korean product. 24.8 & 23.0 circumference cigarettes were generated incorporating both B&H and B&H Deluxe U/L fillers. Screening by Flavor Dev. & Prod. Dev. felt that subjectively the 23.0 circumference cigarette was preferred.

Strategy : Models to be produced at 24.8, 24.0, and 23.0 circumferences. Tar levels have been specified at 9.0mg using A0400 blend. 6.0mg models were also specified utilizing the 1100 blend. Internal screening will determine which product should be used in SCP testing, which will incorporate the imported YSL product.

Tactics and Timetable:

CPC Issued	
Models	November, 1991
Blend/Flavors (Flavor Dev.)	November, 1991
Analyticals (C.I.)	January, 1992
Subjectives (Flavor Dev.)	January, 1992
Consumer Testing - Additional models will be necessary for a tar reduction to 6.0 mg.	
PED Results	May, 1992
Factory Trial	June, 1992
Analyticals (C.I.)	June, 1992
Specifications Issued	July, 1992
New Product Mfg.	September, 1992
Analyticals (C.I.)	September, 1992
Subjectives (Flavor Dev.)	September, 1992
Product Release	September, 1992
Product Launch	October, 1992

Resources :

- Flavor Development	Parrish
- Product Development	Sealey
- Semiworks	Hoskin
- Cigarette Testing	Chambers
- PED	Matthews
- Richmond Panel	Heretick
- Operations Services	Sweeney
- Manufacture Location	

STRATEGIC GOAL 2

100mm 3.0mg product for the Korean Market

Objective : Develop a 100mm 3.0mg product for the Korean marketplace.

Explanatory Introduction:

Utilizing a high efficiency filtration systems (CA/Paper, CA, CA/Carbon on Paper) in conjunction with the Ultima filler, generate models for SCP testing to assess consumer acceptability.

Strategy : Determine from consumer testing if product adequately meets or exceeds Expo's 100's liking score evaluations. Recommend designated product for 3rd Qtr. launch in Korea.

Tactics and Timetable:

CPC Issued	
Models	January 31, 1992
Blend/Flavors (Flavor Dev.)	February, 1992
Analyticals (C.I.)	March, 1992
Subjectives (Flavor Dev.)	March, 1992
Consumer Testing	May, 1992
PED Results	July, 1992
Factory Trial	
Analyticals (C.I.)	August, 1992
Subjectives (Flavor Dev.)	August, 1992
Specifications Issued	August, 1992
New Product Mfg.	September, 1992
Analyticals (C.I.)	September, 1992
Subjectives (Flavor Dev.)	September, 1992
Product Release	September, 1992
Product Launch	October, 1992

Resources :	- Semiworks	Hoskin
	- PED	Matthews
	- Filter Development	Laslie
	- Product Development	Sealey
	- Operations Services	Utz, Weston
	- Cigarette Testing	Chambers
	- Q.A.	Payne
	- Mfg. Location	
	- Cabarrus Primary	
	- FIL U.K.	Dobbins

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STRATEGIC GOAL 3

Parliament Ultra Lights

Objective : Design 6.0mg products with recessed filter for the Korean marketplace.

Explanatory Introduction:

Initiate models with ventilation values in excess of 50%. Blend development may be required for positive subjective response.

Strategy : By use of 250 watt Hauni on line laser, generate recessed Parliament Ultra Light products with a tar value less than 7mg. Because of high ventilation subjective evaluations, it may be necessary to incorporate some blend modifications.

Tactics and Timetable:

CPC Issued	
Models	1st Qtr., 1992
Blend/Flavors (Flavor Dev.)	1st Qtr., 1992
Analyticals (C.I.)	1st Qtr., 1992
Subjectives (Flavor Dev.)	1st Qtr., 1992
Consumer Testing	2nd Qtr., 1992
PED Results	June, 1992
Factory Trial	July, 1992
Analyticals (C.I.)	August, 1992
Subjectives (Flavor Dev.)	August, 1992
Specifications Issued	August, 1992
New Product Mfg.	September, 1992
Analyticals (C.I.)	September, 1992
Subjectives (Flavor Dev.)	September, 1992
Product Release	September, 1992
Product Launch	October, 1992

Resources :

- Stockton Street	Atkins
- Semiworks	Hoskin
- Operations Services	McCarty
- Product Development (International)	Sealey
- Cigarette Testing	Chambers
- Richmond Panel	Heretick
- Flavor Development	Garrett

STRATEGIC GOAL 3

Softer Parliament Lights KS for Korea

Objective : Determine if the current Parliament blend can be modified to produce a "softer" subjective response for both the Parliament Lts. KS SP and FTB.

Explanatory Introduction:

Determine by internal screening if the "softer" response can be obtained by RI technology flavor development can better meet the objective. Once candidate has been designated, initiate consumer testing for acceptability.

Strategy : Present products have not met projected sales objectives and these products now have been re-specified using the A0500 blend. Using internal screening determine if a "softer" product by blend/flavor changes can improve this product to meet projected sales expectations.

Tactics and Timetable:

CPC Issued	2nd Qtr., 1991
Models	2nd Qtr., 1991
Blend/Flavors (Flavor Dev.)	2nd Qtr., 1991
Analyticals (C.I.)	2nd Qtr., 1991
Subjectives (Flavor Dev.)	2nd Qtr., 1991
Models	2nd Qtr., 1992
Analyticals	2nd Qtr., 1992
Flavor Development-Subjectives	2nd Qtr., 1992

Resources :

- Flavor Dev. International	Garrett
- Stockton Street Facilities	Atkins
- Semiworks/Makepack/Primary	Hoskin
- Cigarette Testing Services	Chambers
- Operations Services	Jackson
- PED	Matthews
- Richmond Panel	Heretick

STRATEGIC GOAL 2

Marlboro Lights KS SP/FTB Korea - Tar Reduction

Objective : Reduce current 9.0mg products to 7.0mg for a "softer" product for the Korean market.

Explanatory Introduction:

Utilizing the A012 Marlboro blend, design products with increased puff count and a 2.0mg tar reduction on both the FTB & SP products. (Same as Marlboro Red)

Strategy : Take existing product and reduce tar levels by 2.0mg to 7.0mg FTC. Incorporate a higher puff count and lower the current total RTD levels to products currently in the Korean marketplace. Cigarette tipping color and packaging will remain the same. Marketing concepts of "Lower Tar" to be used for product launch, currently planned for May '92.

Tactics and Timetable:

CPC Issued	January, 1992
Models	2nd Qtr., 1991
Blend/Flavors (Flavor Dev.)	A012 Okay per Richmond Panel
Analyticals (C.I.)	3rd Qtr., 1991
Subjectives (Flavor Dev.)	3rd Qtr., 1991
Consumer Testing	Complete
Factory Trial	2/12/92
Analyticals (C.I.)	2/18/92
Subjectives (Flavor Dev.)	2/18/92
Specifications Issued	2/19/92
New Product Mfg.	2/25/92
Analyticals (C.I.)	2/92
Subjectives (Flavor Dev.)	2/92
Product Release	3/92
Product Launch	5/92

Resources :

- PED	Matthews
- Semiworks	Hoskin
- C.I. Services	Chambers
- Operations Services	Sweeney
- Product Development	Sealey
- Richmond Panel	Heretick
- Flavor Development	Garrett
- Q.A.	Payne

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STRATEGIC GOAL 3

Parliament Inner Charcoal Filter Design

Objective : Redesign the current charcoal component filter system by utilizing a more efficient tow to replace the current FT-555.

Explanatory Introduction:

The inner tow item (FT-555) will be replaced to a more efficient tow item, while maintaining current subjective and analytical values.

Strategy : Utilizing a current tow item (3.9/35,000) generate inner charcoal components to be applicable to current subjective and analytical values associated with the Parliament products. Modifications to outer component may be necessary to maintain product integrity. This modification will incorporate the use of Pica RC 328 charcoal.

Tactics and Timetable:

CPC Issued	
Models	In Progress
Blend/Flavors (Flavor Dev.)	N/A
Analyticals (C.I.)	April, 1992
Subjectives (Flavor Dev.)	April, 1992
Consumer Testing	April, 1992
PED Results	May, 1992
Analyticals (C.I.)	May, 1992
Subjectives (Flavor Dev.)	May, 1992
Specifications Issued	June, 1992
New Product Mfg.	July, 1992
Analyticals (C.I.)	July, 1992
Subjectives (Flavor Dev.)	July, 1992
Product Release	July, 1992
Product Launch	July, 1992

Resources :

- Product Development (International)	Lambert, Sealey
- Operations Services	Jackson
- Cigarette Testing	Chambers
- Richmond Panel	Heretick
- Stockton Street Facilities	Atkins
- Semiworks Facilities	Hoskin

STRATEGIC GOAL 2

Marlboro KS SP/FTB Korea - Tar Reduction

Objective : Reduce current 13.5mg products to 12.0mg for the Korean marketplace.

Explanatory Introduction:

Utilizing current Marlboro blend, reduce tar levels by 1.5mg by cigarette design for both the FTB & SP products. This tar reduction is intended to foster the growth of Marlboro Red in Korea, through bringing the brand family closer to the sales weighted tar average.

Tactics and Timetable:

CPC Issued	January, 1992
Models	Completed 3rd Qtr., 1991
Blend/Flavors (Flavor Dev.)	Completed 3rd Qtr., 1991
Analyticals (C.I.)	Completed 3rd Qtr., 1991
Subjectives (Flavor Dev.)	Completed 3rd Qtr., 1991
Factory Trial	2/12/92
Analyticals (C.I.)	2/18/92
Subjectives (Flavor Dev.)	2/18/92
Specifications Issued	2/19/92
New Product Mfg.	2/25/92
Analytical (C.I.)	2/92
Subjectives (Flavor Dev.)	2/92
Product Release	3/92
Product Launch	5/92

Resources	:	
	- PED	Matthews
	- Semiworks	Hoskin
	- C.I. Services	Chambers
	- Flavor Development	Garrett
	- Product Development	Sealey
	- Richmond Panel	Heretick
	- Operations Services	Sweeney
	- Q.A.	Payne

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STRATEGIC GOAL 2

Merit Lights KS SP for Korea

Objective : Product a 6.0mg Merit Lights KS SP for the Korean market.

Explanatory Introduction:

Currently the 6.0mg standard Japanese product in product testing will be evaluated. Additional development of a softer response product for consumer product testing will include:

- Merit Lts. increased puff count "softer"
- Blend change for "softer" response (Ex. PM Lights)
- Ring Models (PSP filter system)

Strategy : Blend development will be necessary to determine if current PMSL blend is the best candidate for this product. Incorporated into this design will be a product which has a puff count value greater than 7.5. Additional products will also be produced with the Ring A+ flavor system and the PSP filtration system.

Tactics and Timetable:

CPC Issued	November, 1991
Models	Completed December, 1991
Blend/Flavors (Flavor Dev.)	Completed December, 1991
Analyticals (C.I.)	Completed January, 1991
Subjectives (Flavor Dev.)	Completed January, 1991
Consumer Testing	In Progress
PED Results	March, 1992
Factory Trial	Early April
Analyticals (C.I.)	April, 1992
Subjectives (Flavor Dev.)	April, 1992
Specifications Issued	April, 1992
New Product Mfg.	April, 1992
Analyticals (C.I.)	April, 1992
Subjectives (Flavor Dev.)	April, 1992
Product Release	April, 1992
Product Launch	April, 1992

Resources :	- Product Development	Sealey
	- PED	Matthews
	- Purchasing	Jeanrenaud, Cline
	- Operations Services	McCarty
	- Mfg. Location (undetermined)	
	- Cigarette Testing	Matthews
	- Q.A.	Payne
	- Leaf	Scott
	- Flavor Development	Parrish

STRATEGIC GOAL 2

Marlboro Menthol 80mm FTB - 10's - Singapore

Objective : Develop a 15.0mg UK smoking method product 80mm in length with mentholated foil.

Explanatory Introduction:

Produce initial order of 3.5 million with same subjective and analytical characteristics of the current 83mm 20's product.

Strategy :

Tactics and Timetable:

Consumer Testing - None	
CPC Issued	September, 1991
Factory Trial	December 9, 1991
	January 9, 1992
Analyticals	January 23, 1992
Subjectives	January 23, 1992
Specifications Issued	January 28, 1992
New Product Start-up	February 3, 1992
Product Release (Subj. & Analy)	February 19, 1992
Product Launch	Mid February, 1992

Resources :

- Purchasing	Parkerson, Cline
- Operations Services	McCarty
- Cigarette Testing	Chambers
- Q.A.	Payne
- Semiworks	Inge
- Product Development	Sealey
- Richmond Panel	Heretick
- Stockton Street Facility	Atkins
- Louisville Primary	Block
- Flavor Development	Parrish

STRATEGIC GOAL 3.

Marlboro Lights 100's FTB - Regular - Singapore

Objective : Develop 100mm FTB product incorporating A012 filler. Smoking by UK method.

Explanatory Introduction:

Generate a 100mm product for the Singapore market with subjective and analytical values associated with the standard 100mm exported Marlboro 100's FTB Regular Product.

Strategy : Take existing standard US export product and incorporated tropical filler pack OV specifications.

Tactics and Timetable:

Consumer Testing - None	
CPC Issued	January, 1992
Factory Trial	May, 1992
Analyticals	May, 1992
Subjectives	May, 1992
Specifications Issued	May, 1992
New Product Start-up	June, 1992
Product Launch	July, 1992

Resources	: - Operations Services	McCarty, Haywood
	- Mfg. Facility	
	- Cigarette Testing	Chambers
	- Richmond Panel	Heretick
	- Product Development	Sealey

2023160826

STRATEGIC GOAL NUMBER 2

Project 41

Objective:

Develop 1.0 and 4.0mg TIOJ tar products which will achieve superiority in liking over Frontier and Frontier Lights among Caster, Caster Mild, Mild Seven Lights, Mild Seven Super Lights, and Cabin Super Mild smokers. The 4mg product should also be rated at parity with Merit Lights among Milds Seven Lights smokers. A product introduction for the 1.0mg tar product is scheduled for August, 1992.

Explanatory Introduction:

This project entails development of 1.0 and 4.0mg tar products using non-conventional, high efficiency carbon filters. Blend screening was done to finalize the most suitable blend.

Filter development has been the primary task. This has required interacting with external vendors for materials and filter production and coordination of efforts with the Filter Technology group. The objective is to select the filter design that demonstrates the best performance both analytically and subjectively. Analytical performance is measured in terms of filter efficiency and resulting tar delivery. Subjective performance is measured in terms of the smoker's response. Both internal and Danchi testing has been done to gain subjective information.

This project also involves extensive consumer testing using the Danchi panel.

Strategies:

Filter development

To date, five distinct filter configurations have been tested. The field was then narrowed to three designs: (1) Carbon web Paper Core Concentric, (2) FIL Carbon on paper and (3) Intertaba Triple filter. Prototypes have been made in Danchi quantities using all three filters. Subjective and analytical evaluation is complete and Danchi testing is scheduled.

Further development is in progress to optimize the carbon web PCC filter. This entails identifying a vendor capable of producing a carbon web having the necessary processing characteristics needed for successful conversion into a finished filter. These characteristics include sheet uniformity, acceptable carbon loading and retention, desired sheet basis weight and necessary tensile strength to withstand the corrugation process. The ability of the vendor to produce the carbon web in commercial quantities is also a major concern. Due to the time table associated with this project, the ability of the vendor to react quickly in terms of samples and subsequent mill runs is of paramount importance.

Kimberly Clark was the supplier of the carbon web for carbon web PCC filters tested to date. They have been asked to reformulate their sheet to improve its performance in terms of the characteristics listed above. Ecusta has completed a mill run and will supply us with a carbon web for filter conversion. Several other paper companies have been identified and contacted as well. A deadline has been established with all vendors stipulating that response with a viable candidate is required by the end of February, 1992. When warranted, confidentiality agreements will be established with specific vendors to allow for detailed discussion of our needs. Plans are to produce filters as well as prototypes to evaluate the carbon webs.

Consumer Testing

The testing series consists of ten Danchi panel tests. To date, four tests have been conducted with results received for the first three. Models tested include control market place products as well as 1.0mg and 4.0mg prototypes.

Blend Screening

Blend screening is complete. Blend 244, the Bold Blend has been selected as the blend of choice for both the 1.0 and 4.0mg products. Cigarette design will be finalized after review of analytical results from the filter prototypes.

Tactics and Timetable:

• Make 1.0mg prototypes w/three filter designs	January, 1992
• Subjective/Analytical evaluation of prototypes	January, 1992
• Production of prototypes for Danchi testing	January, 1992
• Danchi testing of competitive products, 1.0mg prototypes, and 4.0mg prototypes	January-April, 1992
• CPC Submission	February, 1992
• Screening of potential carbon web suppliers	February, 1992
• Evaluation of carbon webs Filter and Prototype production Subjective/Analytical Evaluation	February-March, 1992
• Selction of carbon web supplier	March, 1992

• Final product design decision	March, 1992
• Order Filter/Materials from vendors	March, 1992
• Factory Trial	April, 1992
• Analytical Evaluation	April, 1992
• Subjective Evaluation	April, 1992
• Issuance of Specifications	May, 1992
• Production Start-up	May, 1992
• Product in Market	June, 1992
• Product Launch	August, 1992

Resource Allocations:

Support requirements -	Filter Technology group	K.Newman/D. Laslie
	CTSD	L. Chambers
	Flavor Technology	K. Parrish/J. Pflueger
	Semiworks	J. Warren/D. Birdsong

STRATEGIC GOAL NUMBER 2

Parliament Lights 100 FTB

Objective:

Reintroduction /National rollout of Parliament Lights 100 FTB in January 1992.

Explanatory Introduction:

This project involves the reintroduction and national distribution of this brand. Benefits are extended advertising and increased volume for the brand family .

Strategies:

Current specifications for this product are already issued. Production of necessary volumes of this product for shipment to Japan will be required. The product will then be distributed in Japan and sales volumes will be monitored during 1992.

Tactics and Timetable:

• Production of brand	November, 1991
• Shipment of product	November, 1991
• Product Relaunch	Jantuary, 1992

Resource Allocations:

Support requirements-	Operation Services Specifications Group	S. Haywood/J. Ellis
	Production Planning & Control	W. Isbell

STRATEGIC GOAL NUMBER 2

Parliament Lights 100 SP

Objective:

Introduction of a line extension for the Parliament brand family. The introduction is scheduled for March, 1992.

Explanatory Introduction:

This will be an introduction of the SP version of Parliament Lights 100 FTB in Japan. Benefits of this introduction are increased advertising and volume for the Parliament brand family.

Strategies:

Current specifications will be generated for this product. Production of necessary volumes of this product for shipment to Japan will be required. The product will be distributed in Japan and sales volumes monitored during 1992.

Tactics and Timetable:

• Issue specifications	January, 1992
• Production of product	January, 1992
• Shipment of product to Japan	February, 1992
• National Introduction	March, 1992

Resource Allocatins:

Support requirements-	Operation Services Specifications Group	S. Haywood/J. Ellis
	Production Planning & Control	W. Isbell
	QA	M. Daniels

2023160831

STRATEGIC GOAL NUMBER 3

Web Development

Objective:

Develop high efficiency filters with and without carbon that exceed filtration capabilities of currently available CA tow items. These filters will be used for low tar delivery products. Development will continue through the first quarter, 1992.

Explanatory Introduction:

Development of filters via coordination of effort with the Filter Technology group. Subjective and analytical evaluation of prototypes and consumer testing of prototypes will also be done. Benefits expected from this development include having alternative filter designs for high efficiency needs. Risks include a dependence on vendors for materials or production of filters and associated costs.

Strategies:

Computer Modeling

Computer modeling is complete. Required filter characteristics have been determined. Some future modeling may be done if significant filter design modifications are made.

Coordinate with Vendors

This is an ongoing process as samples are ordered, received and used for production of prototypes.

Production of Prototypes

This is an ongoing process as samples are ordered and received from the vendors.

Tactics and Timetables:

• Development of suitable filtration media.	January-March, 1992
• Production of prototypes	January-February, 1992
• Evaluation of Filter Performance	January-February, 1992
• Consumer Testing	February-March, 1992

Resource Allocations:

Support requirements- Filter Technology K.Newman/D. Laslie

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CTSD	L. Chambers
Flavor Technology	K. Parrish/J. Pflueger
Semiworks	J. Warren/D. Birdsong

ACTIVITIES NOT INCLUDED IN STRATEGIC PLAN

Specification Consolidation

Parliament Casing Consolidation

Objective:

Coordinate the implementation of the recommended casing consolidation for Parliament brands. Implementation is to be effective as of factory start-up, January, 1992.

Explanatory Introduction:

This project serves to consolidate the filler used for all Parliament brands (domestic and export, charcoal and non-charcoal) with the exception of Parliament Lights KS SP and FTB for Korea. The pack O.V. for all Parliament brands will also be consolidated to 13.0% with the exception of Parliament 83mm FTB GCC @ 12.0% O.V.

Strategies:

Monitor Implementation

A memo was issued to Operations Services listing all Parliament brands affected by the casing consolidation. The memo indicated the effective date of 1/6/92. Discussions with production personnel and persons in Operations Services indicate no problems to date with the implementation.

Review Specifications of Exception Brands

Specifications for Parliament Lights KS SP and FTB for Korea and Parliament 83mm FTB GCC will be reviewed to determine the feasibility of including these brands in the consolidation.

Tactics and Timetable:

• Monitor Implementation	January, 1992
• Review Specifications of Exception Brands	1st Qtr, 1992
• Elimination of Parliament Lts KS Korea cut filler	March, 1992

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ACTIVITIES NOT INCLUDED IN STRATEGIC PLAN

New Product Development

Parliament Ultra Lights

Objective:

Develop a Parliament line extension product in the 6-7mg TIOJ tar delivery range.

Explanatory Introduction:

Develop a lower delivery Parliament product utilizing a 250 watt on-line laser to achieve ventilation targets in excess of 60%.

Strategies:

Cigarette modeling and design

Preliminary modeling and design work has been done.

Prototype production

Production will begin following installation of the 250 watt laser in Semiworks.

Consumer Testing

Testing will follow production of prototypes.

Tactics and Timetable:

Cigarette modeling/design	February,1992
Prototype production	1st Qtr, 1992
Subjective/Analytical Evaluation	1st Qtr, 1992
Danchi Testing	2nd Qtr, 1992
Finalize Specification	2nd Qtr, 1992

2023160835

STRATEGIC GOAL 1

Smoking Methodologies:

Objective:

Monitor the implementation of the new ISO method, methodology standardization/improvements in export markets. Initiate comparative smoking studies in export markets as required.

Explanatory Introduction:

The new ISO method has been developed to aid in standardizing smoking methodologies throughout the world. During the upcoming year, many markets in which P.M. operates will be implementing this method. In order to ensure that our product specifications and packaging materials are revised to conform with smoking methodology changes, the implementation plans in our export markets must be closely monitored.

Strategy:

Stay in contact with PM Asia, PM Europe R&D, and TTG personnel so that Export Product Development receives up-to-date information as export markets implement the new ISO methods, and standardize or improve smoking methodologies. Initiate specifications revisions for P.M. export products as these markets implements the new ISO method so that packaging materials and inhouse smoking methodologies can be converted to comply with new smoking methods and regulations. Review data generated from these markets and Philip Morris to ensure that consistent data is being generated. Initiate collaborative smoking studies through TTG as required to address inconsistencies in smoking data between Philip Morris and the appropriate export market(s).

Tactics and Timetable:

Task	Complete	Resources
• Asia/TTG Communications/Monitoring	Ongoing	Hickle, Henriksen, Bright
• Initiate Specifications Revisions	As required	Hickle, Export Product Dev., Technical Services, QA, Purchasing
• Data Review	Ongoing	Hickle, Laffoon, Bright
• Collaborative Studies	As required	Hickle, Henriksen, Bright

2023160836

Competitive Product Analysis:

Objective:

Monitor competitive products in export markets on a continuous basis through periodic analytical evaluations of existing brands, and analytical and subjective evaluations of new products introductions/product modifications.

Explanatory Introduction:

New products are constantly being introduced in our export markets by our competitors. To maintain our competitive edge, it is important to be aware of new product introductions, and, when possible, analytically and subjectively evaluate these products. The growth of these products should also be monitored as a part of the overall trend analyses for our export markets. Where new technology is incorporated in new market offerings, it should be thoroughly evaluated and monitored.

Strategy:

Provide support to CTSD by reviewing the Japan and All Asia CI Reports, and revising the market sampling plans as needed to ensure that the appropriate brands are being requested for monthly/annual analytical evaluations. Maintain contact with P.M.K.K. to ensure that new products introduced on the Japanese market are being received in Richmond for analytical and subjective evaluations. Update the "New Product Launch Sheet" information as received from PM Asia.

Tactics and Timetable:

Task	Complete	Resources
• Review Japan CI	Quarterly	Hickle, Laffoon
• Review All Asia CI	Biannually	Hickle, Laffoon
• Revise market sampling plan	As needed	Hickle, Laffoon
• Order Annual Japan CI samples	Monthly	Hickle, Nakamura
• Submit Japan New Products to CTSD	As received	Hickle, Nakamura
• Submission of New Products to Flavor Development by CTSD	As received	Laffoon, Deane
• Update "New Product Launch Sheet" Information	As received	Caltabiano, Smith, Hickle

STRATEGIC GOAL 2

Marlboro 100 FTB Japan:

Objective:

To enhance the growth of the Marlboro family in the Japanese market by developing and introducing Marlboro 100 FTB in Japan on June 1, 1992.

Introductory Explanation:

The Marlboro brand family has increased approximately 21% SOM during the past year. Marlboro 100 SP was discontinued during September of 1990 due to poor market performance. Marlboro 100 FTB will be introduced in June, 1992 to enhance the current growth of the Marlboro family and to allow a continuance of television advertising for the Marlboro family of products. The box segment of the market has been growing over the last several years. J.T. has also offered P.M.K.K. two first priority months in sales promotion support (June and July) for this brand. These factors should contribute to a successful product launch.

Strategy:

Produce Marlboro 100 FTB prototypes in J.T.'s Odawara factory for evaluation in Richmond. Finalize specifications and provide them to J.T. to ensure that production start-up is not delayed. Monitor production start-up of Marlboro 100 FTB in J.T.'s Odawara factory and sample production for analytical and subjective evaluations in Richmond. Monitor the product on an ongoing basis to ensure product conformance to specifications. Make appropriate modifications to product specifications as needed.

Tactics and Timetable:

Task	Complete	Resources
• Prototype Production (Odawara)	November, 1991	Hickle, JT
• Issue Preliminary Specifications	December, 1991	Hickle
• Prototype Production 150ml tipping (Odawara)	January, 1992	JT
• Subjective/Analytical Evaluations	February, 1992	Hickle, Parrish, RPanel, LPanel
• Issue Final Specifications	February, 1992	Hickle
• Monitor Production Start-up	March, 1992	Hickle, Brumberg, JT, Cooper
• Subjective/Analytical Evaluations	March, 1992	Hickle, Brumberg, Parrish, RPanel, LPanel
• Market Introduction	June 1, 1992	PMKK, JT
• Continuous Product Monitoring	Ongoing	Hickle, Laffoon
• Product Modifications	As needed	Hickle, Brumberg

Marlboro Japan DIET Development Program:

Objective:

To evaluate DIET inclusion in the Japan Marlboro family of products using DIET expanded Japanese tobacco grades in order to enhance subjective and analytical performance and control of these products. To produce a Japan Marlboro with DIET inclusion at J.T.'s Kanazawa factory which performs comparably to the current Japan Marlboro on Danchi panel testing. To develop a phase-in program for inclusion of DIET in the Japan Marlboro family of products.

Explanatory Introduction:

Currently, the Japan Marlboro is the only significant cigarette brand on the Japanese market without an expanded component included in the blend. Pressures to lower tar deliveries have been increasing in this market. The Japan Marlboro and Marlboro Lights are approaching the practical limitations of their blend and physical systems to lower delivery without compromising subjective performance. No acceptable expanded or improved blend component is available for use in the foreseeable future in Japan. This project will provide an acceptable burn control agent for the Japan Marlboro family. This program will permit future lowering of deliveries without extreme adjustments to construction and blend formulation, thus ensuring subjective continuity of the product. Additional programs to evaluate reduced tar Japan Marlboro products should be coordinated with this project. This project will require coordination of efforts with PM Australia, Japan Tobacco and PM Asia. Communications must be timely and efficient. If communications are delayed due to Mr. Cooper's absence from the PM Asia office during periods of travel, the timetable for this project will be negatively impacted.

Strategy:

Develop a program plan with Leaf Department which is acceptable to P.M. management. R&D, Leaf Department and P.M. Asia personnel meet with J.T. technical personnel and agree on a plan for investigating DIET inclusion in the Marlboro products produced by J.T. Conduct preliminary blend and cigarette prototype trials with Leaf Department in the U.S. in Semiworks using tobacco from J.T. and mimicking the physical design parameters as closely as possible. Initiate flavor development work if required. Subjectively and analytically evaluate prototype production. Review results of these trials with P.M. management and J.T. Arrange for shipment of Japanese tobacco to Australia for expansion. Monitor expansion with Leaf Department and evaluate finished expanded tobacco in Australia for release back to J.T. Conduct factory trials in J.T.'s Kanazawa factory of blends with DIET inclusion with Leaf Department. Produce Danchi test cigarettes during the factory trials. Review analytical and subjective results with P.M. management and J.T. personnel. Review Danchi testing results with P.M. management and make a recommendation regarding DIET inclusion. Submit Marlboro products with DIET inclusion for CPC approval if appropriate. Develop a phase-in plan with Leaf Department so that DIET inclusion negotiations could be initiated with J.T.

Tactics and Timetable:

Task	Complete	Resources
• Develop Program Plan	January, 1992	Hickle, Brumberg
• P.M. Management Approval of Plan	February, 1992	Smith, Heretick, Riggan, Myracle, Roper, Cooper
• Meet with J.T. to Agree on Plan	March, 1992	Hickle, Brumberg, JT, Cooper
• Order Tobacco from J.T.	March, 1992	Brumberg, JT
• Ocean Freight Tobacco to U.S.	April, 1992	JT
• Semiworks Trials		
• DIET expansion	May, 1992	Lum, Brumberg, Moogalian
• Analytical/Subjective Eval.	May, 1992	Brumberg, Moogalian, CTSD
• Primary trials	May, 1992	Romig, Birdsong, Brumberg, Hickle
• Filler Analytical	May, 1992	Romig, Brumberg, CTSD
• Make/Pack trials	June, 1992	Hickle, Brumberg, Birdsong, Inge, Hoskin
• Flavor Dev. if required	June, 1992	Parrish
• Analytical/Subjective Evaluations	June, 1992	Hickle, Brumberg, Parrish, RPanel, LPanel, CTSD
• P.M. Management Approval to Proceed	July, 1992	Houghton, Myracle, Heretick, Smith, Riggan, Roper, Webb, Cooper
• Consult with PM Australia	July, 1992	Brumberg, Hickle, Moogalian, Lum, Heath
• Review S/W Results with J.T.	July, 1992	Brumberg, Hickle, JT
• Consult with PM Australia	August, 1992	Brumberg, Hickle, Heath
• Factory Trial Specifications to J.T.	August, 1992	Hickle, Brumberg
• Expansion of Tobacco in Australia	September, 1992	Hickle, Brumberg, Heath, Moogalian, Lum
• Analytical/Subjective Eval. (PMAUS)	September, 1992	Hickle, Brumberg, Heath, Moogalian, Lum
• Ocean Freight DIET to Kanazawa	November, 1992	Heath
• Kanazawa Factory Trials	November, 1992	Hickle, Brumberg, JT
• Danchi Test Production - Kanazawa	November, 1992	Hickle, Brumberg, JT
• P.M. Analytical/Subjective Evaluations	December, 1992	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Danchi Fieldwork	December, 1992	Matthews, Jones, PMKK
• Danchi Results	January, 1993	Matthews, Jones
• Review Results with P.M. Management	January, 1993	Matthews, Jones, Hickle, Brumberg, Heretick, Myracle, Smith, Riggan

• P.M. Management Approval to Proceed	January, 1993	Houghton, Myracle, Heretick, Smith, Riggan, Roper, Webb, Cooper
• CPC Submission	February, 1993	Hickle, Henriksen
• Review Results with J.T.	February, 1993	Hickle, Brumberg, Cooper
• Develop DIET Phase-in Program	February, 1993	Brumberg, Hickle

Japan Marlboro Factory Location Change:

Objective:

To monitor J.T.'s production transfer for Marlboro products from the Odawara factory to the Kanazawa factory to ensure that primary and make/pack equipment conform to P.M. requirements for Marlboro production. To conduct factory trials in Kanazawa and produce consumer tests during the transition period to ensure product consistency.

Introductory Explanation:

The production of Marlboro at J.T.'s Odawara factory has been approaching the maximum capacity available at this factory due to the recent growth of the Marlboro family on the Japan market. In order to accommodate future growth, production will be moved from the Odawara factory to the Kanazawa factory. This will be done in phases over a six month period of time. Factory trials and Danchi test production will be required for each of the Marlboro brands. Coverage will also be required for the production start-up of each brand in the Odawara factory. Communications with J.T. will be vital during this process. Mr. Cooper's absence from PM Asia due to travel requirements could negatively impact timely communications and exchange of vital information.

Strategy:

Visit the J.T. Kanazawa factory after primary modifications have been completed to ensure that these modifications conform to requirements outlined by P.M. personnel in August, 1991. Conduct a primary factory trial in Kanazawa upon completion of modifications. Conduct factory trials during the production transfer phase for each of the Marlboro family brands. Produce Danchi tests during the factory trials to ensure that the Kanazawa production is consistent with the Odawara factory production. Evaluate all products subjectively and analytically in Richmond. After P.M. approval of factory trial production, monitor each production start-up for each brand during the production transfer period. Conduct analytical and subjective evaluations of these products.

Tactics and Timetable:

Task	Complete	Resources
• Review Production Transfer Plan	March, 1992 March, 1992	Hickle, Brumberg, JT, Cooper
• Inspection of Kanazawa Primary	July, 1992	Hickle, Brumberg, JT,
Cooper, Tucker		
• Kanazawa Primary Processing Trial	July, 1992	Hickle, Brumberg, Tucker, JT
• Marlboro Lights KS Factory Trial (Kanazawa)		Hickle, Brumberg, JT
• Produce Marlboro Lights KS Danchi Test		Hickle, Brumberg, JT
• Odawara		
• Kanazawa		
• Analytical/Subjective Evaluations		Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel

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• Marlboro Lts: Danchi Fieldwork	Matthews, PMKK
• Marlboro Lights KS Danchi Results	Matthews, Jones
• Marlboro Lts KS Production Start-up (Kanazawa)	Hickle, Brumberg, JT
• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Marlboro KS Factory Trial (Kanazawa)	Hickle, Brumberg, JT

• Produce Marlboro KS Danchi Test
  • Odawara
  • Kanazawa
	Hickle, Brumberg, JT

• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Marlboro Danchi Fieldwork	Matthews, PMKK
• Marlboro KS Danchi Results	Matthews, Jones
• Marlboro KS Production Start-up (Kanazawa)	Hickle, Brumberg, JT
• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Marlboro 100 Factory Trial (Kanazawa)	Hickle, Brumberg, JT

• Produce Marlboro 100 Danchi Test
  • Odawara
  • Kanazawa
	Hickle, Brumberg, JT

• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
Marlboro 100 Danchi Fieldwork	Matthews, PMKK
• Marlboro 100 Danchi Results	Matthews, Jones
• Marlboro 100 Production Start-up (Kanazawa)	Hickle, Brumberg, JT
• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel

Japan Marlboro/Marlboro Lights Tar Reduction:

Objective:

To develop reduced tar Marlboro K.S. and Marlboro Lights K.S. prototypes for evaluation on Danchi testing.

Explanatory Introduction:

Downward trends in deliveries are being observed for the Japanese market. The purpose of this program is to evaluate Marlboro Red at 13mg TIOJ tar and Marlboro Lights at 9mg TIOJ tar. The targets for these products are currently 15mg and 11mg TIOJ tar, respectively. Efforts to achieve these tar reductions through physical construction, essentially ventilation, should be coordinated with the Japan Marlboro DIET development program. The two methods for achieving tar reduction (blend and ventilation) could then be evaluated together on the Danchi III panel.

Strategy:

Develop test specifications and conduct factory trials in Japan for reduced tar versions of Marlboro K.S. and Marlboro Lights K.S. These products will be subjectively and analytically evaluated in Richmond prior to Danchi panel testing. Review testing results and make a recommendation to P.M. management with respect to additional testing or product changes.

Tactics and Timetable:

Task	Complete	Resources
• Determine Timetable for Program		Hickle, Smith, Heretick, Myracle, Cooper
• Present Prototype Production Plan to J.T./Agree on Schedule		Hickle, JT
• Test Specifications to J.T.		Hickle
• Danchi Test Production in Japan		Hickle, JT
• Analytical/Subjective Evaluations		Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Danchi Fieldwork		Matthews, PMKK
• Danchi Test Results		Matthews, Jones
• Review/Recommendation to Management		Hickle, Brumberg, Matthews, Jones

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Japan Marlboro Mainstream Development Program (U.S.):

Objective:

To develop a mainstream Japanese blend and prototypes in the U.S. for evaluation on the Danchi panel with production Marlboro from Japan.

Explanatory Introduction:

The current Japan Marlboro has received excellent ratings on Danchi panel testing. The Leaf Department was asked to develop a blend, using components available in the U.S., which would subjectively perform comparably to the J.T. blend in a Marlboro Lights configuration on the Danchi panel. Future applications for this blend would then be determined.

Strategy:

Initial blend development work has been completed by the Leaf Department. Prototypes will be produced in Semiworks with this blend and U.S. Marlboro flavors using product design specifications similar to Japan Marlboro and Marlboro Lights K.S. PED has outlined a Danchi III testing program for Marlboro which includes two tests incorporating these prototypes. The first test includes Marlboro and Marlboro Lights K.S. at reduced tar which will be made in Japan after negotiations with J.T. The second test will include Marlboro K.S. and Marlboro Lights K.S. produced in the Kanazawa factory. The timetable for the transfer of these products from Odawara to Kanazawa has not yet been established.

Tactics and Timetable:

Task	Complete	Resources
• Initial Blend Development	January, 1992	Keatts, Brumberg
• Initial Blend Run - S/W	January, 1992	Romig, Parrish, Keatts, Brumberg, Birdsong
• Prototype Production - S/W	February, 1992	Hickle, Birdsong, Inge, Hoskin
• Analytical/Subjective Evaluations	February, 1992	Hickle, Keatts, Brumberg, Parrish, CTSD, LPanel
Additional Blend/Flavor Dev.	TBD	Keatts, Brumberg, Parrish
• Danchi Test I Production - Reduced Tar (J.T., S/W)		Hickle, JT, Birdsong, Romig, Keatts, Brumberg, Parrish, Inge, Hoskin, Precon
• Analytical/Subjective Evaluations		Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Danchi Test I Fieldwork		Matthews, PMKK
• Danchi Test I Results		Matthews, Jones

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• Danchi Test II Production (Kanazawa, S/W)	Hickle, JT, Romig, Parrish, Keatts, Brumberg, Birdsong Inge, Hoskin, Precon
• Analytical/Subjective Evaluations	Hickle, Brumberg, Parrish, CTSD, RPanel, LPanel
• Danchi Test II Fieldwork	Matthews, PMKK
• Danchi Test II Results	Matthews, Jones

Pan Asian Menthol:

Objective:

To develop a family of menthol products, full flavor and lights, to compete with Salem and Salem Lights in the Asia region.

Explanatory Introduction:

Menthol imports in the Asia Region are dominated by Salem and Salem Lights. The purpose of this program is to develop market specific menthol products which share a common name and advertising approach so that P.M. will be competitive in the menthol segment of these markets. The specific markets under consideration at this time are Hong Kong, Japan, Singapore and Thailand.

Strategy:

Menthol panels were established in Hong Kong and Japan in 1991. Baseline menthol tests and menthol/blend prototypes have been evaluated on these panels. HKCP Menthol test E-V814 (8mg PMSL w/0.63 menthol, Salem Lights, 12.5mg PMSL w/0.54 menthol, Salem) is currently in the field. Danchi IV test E-X129 (8mg MB4b w/0.60 menthol, Salem Lights, 14mg MB4b w/0.55 menthol, Salem) is currently being produced in Semiworks. Two PMI tests are planned in Hong Kong after completion of the HKCP Menthol panel testing. Product recommendations will be made to P.M. management for these markets and specifications developed in preparation for potential launches. Baseline menthol testing will continue on the HKCP Menthol and Danchi IV panels.

Tactics and Timetable:

Task	Complete	Resources
• HKCP Menthol E-V814 Results	February, 1992	Matthews, Jones
• Danchi IV E-X129 Production	February, 1992	Hickle, Inge, Hoskin, Birdsongg, Precon
• Analytical/Subjective Evaluations	February, 1992	Hickle, Parrish, CTSD, RPanel
• Danchi IV E-X129 Fieldwork	March, 1992	Matthews, PMKK
• Hong Kong PMI Production (2)	April, 1992	Hickle, Birdsong, Inge, Hoskin, Precon
• Danchi IV E-X129 Results	April, 1992	Matthews, Jones
• Danchi IV Baseline Test	April, 1992	Hickle, Birdsong, Inge, Hoskin, Precon
• Analytical/Subjective Evaluations	April, 1992	Hickle, Parrish, CTSD, RPanel
• Danchi IV Fieldwork	May, 1992	Matthews, PMKK
• Hong Kong PMI Fieldwork	May, 1992	PM Asia

• Danchi IV Results	June, 1992	Matthews, Jones
• Hong Kong PMI Results	June, 1992	PM Asia, PMNY
• Review/Recommendations to Management	July, 1992	Matthews, Jones, Hickle, Parrish
• Preliminary Specifications	September, 1992	Hickle
• Production Start-up (Hong Kong)	TBD	
• Production Start-up (Japan)	TBD	
• Market Introduction (Hong Kong)	TBD	
• Market Introduction (Japan)	TBD	

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Caster-Type Product:

Objective:

To develop uniquely flavored products to compete with Caster and Caster Mild on the Japanese market.

Explanatory Introduction:

The Caster family of products continues to increase in market share in Japan. This is a uniquely flavored brand family and, at this time, P.M. has introduced nothing to compete directly in this segment. In this program, potential candidates for this segment will be identified so that development time can be minimized should PMKK marketing request a product of this type for market introduction.

Strategy:

Develop unique flavor systems for evaluation on existing blends. Prototypes will be subjectively screened by Flavor Development (K. Parrish) and Export Product Development. Candidates will be identified for Danchi Panel testing with Caster and Caster Mild. Danchi testing will be conducted upon request from P.M.K.K. marketing if a potential is identified for this type of product.

Tactics and Timetable:

Task	Complete	Resources
• Prototype Production for Flavor Dev. I	March, 1992	Hickle, Parrish, Birdsongg, Romig, Inge, Hoskin
• Flavor Development - Phase I	May, 1992	Parrish
• Prototype Production - Phase I	June, 1992	Hickle, Parrish, Birdsongg, Romig, Inge, Hoskin
• Internal Subjective/Analytical Eval.	July, 1992	Hickle, Parrish
• Prototype Production for Flavor Dev. II	August, 1992	Hickle, Parrish, Birdsongg, Romig, Inge, Hoskin
• Flavor Development - Phase II	October, 1992	Parrish
• Prototype Production - Phase II	November, 1992	Hickle, Parrish, Birdsongg, Romig, Inge, Hoskin
• Internal Subjective/Analytical Eval.	December, 1992	Hickle, Parrish
• Danchi Test Recommendation (if any)	December, 1992	Hickle, Parrish

Additional Responsibilities:

Budgets:

- 5R1, 5R3, 5R5, 5R6, 5R7, QZ92, QZ93
- Asset Management

Estimated Travel:

- 10 trips to Asia

% SOM Spreadsheets by Market:

- Quarterly updates
  - Japan
  - Korea
  - Hong Kong

Virginia Slims Lights:

- Regular Charcoal
- Menthol
- Possible consumer testing
- Development work for Virginia Slims Super Lights Menthol SP
  - Launch Date 1/1/93

Mild Seven Review

Wish List:

- Pursue computerized project management system approach to aid in organizing, planning and coordinating programs.

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Paper Technology Plan

February 17, 1992

I. Introduction

The paper technology program has as its overall objective the development of proprietary cigarette papers for new products. The specific applications at this time are: 1) products with reduced sidestream visibility; 2) papers which will allow control of burn rate for Project Tomorrow; 3) the determination of specifications for cigarette papers which will be consistent with current cigarette specifications; 4) the design of papers which may allow control of sidestream smoke chemistry; and 5) studies which will evaluate the feasibility of replacing flax paper with wood pulp paper. Each of these applications will be covered in detail below.

II. Products with Reduced Sidestream Visibility (Strategic Goal Number 3)

A. Objective - To develop a proprietary cigarette wrapper which will reduce visible sidestream smoke by at least 70% in a full circumference cigarette, as compared to an appropriate control, with subjectives equivalent to a conventional cigarette by 1992.

B. Introduction and Status

Philip Morris has been working on cigarettes with reduced sidestream visibility for about eleven years. Work was initiated with the commercial introduction of a reduced sidestream brand, Passport, in Canada, and has grown in importance during the intervening years as a consequence of the public's growing, although misplaced, concern over passive smoke. Passport utilized a paper manufactured by Ecusta containing 12% magnesium hydroxide. The product had serious subjective problems and was not a commercial success. During the first seven years that R&D was involved in a reduced sidestream program we depended on our two suppliers, Ecusta and Kimberly-Clark, to provide us with low sidestream papers. Four years ago, however, a decision was made to attempt to develop our own low sidestream paper. This was done first of all because our suppliers have not been strikingly successful in providing us with a paper which will achieve our objectives. More importantly, however, it is essential that we develop our own proprietary papers to obtain a clear competitive advantage. In 1989 we developed a slim cigarette with sidestream reduction which met our target and acceptable subjectives. This product utilized a double wrap system. The outer wrap was developed jointly by PM and Kimberly-Clark. It has a 45 g/m^2 basis weight, contains 35% calcium carbonate with a

surface area of 20 m^2 /g, and contains potassium succinate, monoammonium phosphate (MAP) and sodium carboxymethyl cellulose (CMC) as additives. The inner wrap is a thin (18 g/m^2) paper with 3% low surface area calcium carbonate and 2% potassium citrate. This product was introduced nationally in September, 1989. Neither the system used on the slim cigarette nor the Ecusta magnesium hydroxide paper, however, has proved to be satisfactory for a full circumference cigarette. Both wrappers give products with significant subjective problems.

Significant success was achieved in 1990 with the development of a single wrap, calcium carbonate containing wrapper for a full circumference cigarette. This wrapper had a basis weight of 53 g/m^2 , contained 33% Multifex calcium carbonate, and used about 13% mono potassium phosphate as a fluxing agent and had a porosity of 6 Coresta. Charcoal-filtered cigarettes made with this paper gave about 55-60% sidestream visibility reduction, and did reasonably well with respect to liking scores versus Marlboro Lights 100's. A variation of this paper has also been developed as a single wrap for Superslims to take the place of the current double wrap.

Little work was done with papers of this type in 1991 except for refining cigarette design aspects. Instead, considerable emphasis was placed on the development of magnesium-containing fillers. The three systems under investigation are magnesite, either mined or synthetic; a crystalline composite of hydromagnesite and brucite prepared by the reaction of magnesium hydroxide with carbon dioxide followed by treatment of the magnesium bicarbonate intermediate with magnesium hydroxide; and an amorphous (sol-gel) composite of hydromagnesite and brucite. Considerable paper development work has been done for mined magnesite, and cigarette development work is in progress. Synthesis of sufficient quantities of magnesite to make papers at the University of Maine is nearly complete. Scale-up of the crystalline hydromagnesite/ brucite composite will be initiated shortly, while laboratory work for the sol-gel material is still being carried out. Paper development work will be completed on all of these materials in the current year. We are also investigating the utility of ground (rhombohedral) calcium carbonate which has shown promise in preliminary studies.

In order to achieve the objective of developing a proprietary paper which will reduce sidestream visibility in a full circumference cigarette, we have delineated eight major strategies. These strategies are:

1. Optimize the single wrap for regular and menthol Superslims to achieve an average of 70% sidestream visibility reduction and maintain the current tar delivery target.

2. Develop one or more functioning cigarette prototypes incorporating a magnesite wapper and have the maximum sidestream reduction that is compatible with acceptable subjectives.

3. Develop low sidestream papers based on synthetic magnesite and compare these papers to comparable papers containing Baymag magnesite.

4. Develop low sidestream papers based on crystalline composites containing hydromagnesite and brucite (i.e., aqueous non-sol-gel process).

5. Develop low sidestream papers based on amorphous forms of magnesium carbonate (sol-gel process) using material which can be scaled up to produce commercial quantities.

6. Develop low sidestream papers based on calcium carbonates with rhombohedral morphology.

7. Utilize the sidestream chamber to fully characterize the analytical chemistry of sidestream smoke from appropriate prototypes.

8. Elucidate the chemistry of the pyrolysis/combustion of cigarette paper as a function of additives, temperature, etc.

Each of these strategies will be discussed below. A brief discussion of current status will be given followed by the specific tactics, along with target dates, which will be used to realize each strategy.

C. Strategies

1. Strategy Number 1 - Optimize the single wrap for regular and menthol Superslims to achieve an average of 70% sidestream visibility reduction and maintain the current tar delivery target. First Quarter, 1992.

a. Status

A single wrap was developed for Virginia Slims Superslims utilizing high basis weight paper technology. This proprietary Philip Morris paper originally gave 70% sidestream visibility reduction and offered the potential for both cost and manufacturing advantages. The base paper has a basis weight of 47.5 g/m^2 , a Coresta porosity of 10.5, an inorganic filler consisting of 33% Multifex calcium carbonate, and it is coated with 10.5% mono potassium phosphate. Preliminary specifications and tolerances were established for this paper at the time during which the base sheet must be produced in Spotswood and shipped to the Ancram mill for coating. Specifications will be finalized when the paper can be coated on-line at Spotswood. A QA method for the analysis of the paper has been established.

Initial shipments of single wrap were made to 11.5 Coresta target. This was changed to 10.5 Coresta when factory pick-ups gave less than the desired 70% visibility reduction. Even with the lowered Coresta target, the performance of the production paper did not match that of the paper used to set specifications. The two lots of paper showed agreement in all critical paper parameters such as porosity, basis weight, and sizing level. It was hypothesized that two papers with similar Coresta permeability could have different internal structure which could possibly affect the gas diffusional characteristics of the papers. To test this hypothesis, studies were conducted to characterize the internal structure of paper using a mercury intrusion technique. Results do not conclusively suggest a relationship between the mercury porosimetry data and the performance of the two Superslims papers, but they did indicate some differences.

Kimberly-Clark has recently put forward an hypothesis to explain the differences in the performance of experimental and production papers. Based on laboratory and pilot studies, KC found that the calcium carbonate (chalk) and mono potassium phosphate (MKP) react to form a water-insoluble calcium phosphate and carbon dioxide gas. They claim that the farther this reaction proceeds, the greater the sidestream reduction. KC measures the extent of the reaction by analyzing water-extractable phosphate. Lower water-extractable phosphate indicates extensive reaction, as compared to total MKP measured by acid extraction. KC submitted two papers that were treated differently to effect the extent of reaction between chalk and MKP. The paper with lower (~2.0%) water-extractable phosphate gave significantly higher sidestream reduction (79%) than the paper with higher (~5.0%) water-extractable phosphate (65%). However, the porosities of the two papers were

not matched; the paper with lower water-extractable phosphate being 3 Coresta units lower in porosity.

In order to further test KC's hypothesis, trials were conducted on the #14 machine at KC's Spotswood mills. Several process variables were used to control the extent of reaction, but the resultant papers did not show any significant differences in either the water-extractable phosphate or the sidestream performance. One of the primary problems in testing KC's hypothesis is the lack of a definitive correlation between water-extractable phosphate and sidestream performance at equal porosity, chalk, and total MKP level. Further work is necessary to define these interactions.

A number of approaches are being considered to redesign the paper to achieve 70% SS reduction. Inherent in this work is the attempt to understand the chemistry involved in the reaction of chalk and MKP. Not only can such an understanding help bring an acceptable solution to the current problem, but it may prove of major importance to the next generation of reduced sidestream products.

b. Tactics and Timetables

(1) Determine if a relationship exists between "water-extractable" phosphate and sidestream visibility reduction for papers whose specifications are otherwise matched. Establish the normal variation of "water-extractable" phosphate levels for current production papers - First quarter, 1992. (S. Tafur)

(2) Using a battery of analytical methodologies, examine mill trial and production papers and those having different levels of "water-extractable" phosphate to identify the reaction products between calcium carbonate and monobasic potassium phosphate (MKP) - First quarter, 1992. (S. Tafur)

(3) Establish if identifiable reaction products can be related to sidestream reduction by virtue of their chemical nature or by their effect on the internal structure of the paper (e.g. coating of fibers and/or porosity reduction) - Second quarter, 1992. (S. Tafur)

(4) Identify and examine process conditions which could affect the extent of reaction of calcium carbonate and MKP for both the one step

and two step processes and allow control of sidestream reduction - First quarter, 1992. (N. Gautam, S. Tafur)

(5) Obtain process information from KC on one- and two-step operations and original grade 047 paper. Based on this information, duplicate the original two-step run at Ancram - First quarter, 1992. (N. Gautam)

(6) As a potential means for influencing the extent of reaction between calcium carbonate and MKP, examine the effects of adjusting the pH of the MKP sizing solution on paper properties and performance - First quarter, 1992. (B. Goodman)

(7) Examine the effects of post-production conditioning treatments on the reaction of calcium carbonate and MKP and subsequent sidestream reduction performance of the papers - First quarter, 1992. (S. Tafur, N. Gautam)

(8) Complete evaluation of cigarettes with paper from Kimberly-Clark's second trial run of on-line phosphate addition on machine #14 at Spotswood, including subjective evaluation of lower Coresta and higher MKP levels - February, 1992. (B. Goodman)

(9) Determine the effect of the processing aid used in the one-step production of paper at Spotswood on the reaction of calcium carbonate and MKP - First quarter, 1992. (N. Gautam, S. Tafur)

(10) Adjust the level of mono potassium phosphate and/or Coresta to achieve 70% visibility reduction with paper containing a P.M. approved processing aid - First quarter, 1992. B. Goodman

(11) Demonstrate machinability of one-step paper on production equipment in Louisville - Second quarter, 1992. (L. Wettle)

(12) Determine final acceptable tolerances in Coresta, chalk and phosphate levels for production papers after implementation of the use of the new size press at Spotswood - Second quarter, 1992. (B. Goodman)

(13) Determine desirable production process parameters for mono potassium phosphate addition to achieve paper that gives maximum sidestream reduction - First quarter, 1992. (S. Baldwin, N. Gautam)

(14) Determine feasibility of using rhombohedral calcium carbonate as the filler mixed with Multifex MM in Superslims paper - March 1992. (S. Baldwin, S. Tafur, G. Bokelman, B. Goodman)

c. Resource Allocations

Paper Technology:

Professionals	0.55
Technicians	0.45
Total	1.0

Other P.M. Resources:

Operations Services
CTSD
ARD
Domestic Product Development
Purchasing
QA
Chemical Research

d. Potential Projects

Modelling of eight port experimental sidestream visibility data, and generating control charts of control cigarettes.

Developing an additional matrix of low sidestream paper additives and base composition.

2. Strategy Number 2 - Develop one or more functioning cigarette prototypes that incorporate a magnesite wrapper and have the maximum sidestream reduction that is compatible with acceptable subjectives.

a. Status

Among the most promising inorganic fillers investigated to date for reduced sidestream papers are various compositions and morphologies of magnesium carbonate. The chemistry of magnesium carbonate is complex, and many phases exist. Of these the crystalline phase magnesite ($MgCO_3$) has proven most useful to date. This mineral form of magnesium carbonate is not a commercial product, and it was initially examined as a synthetic material at Philip Morris. Later, a natural source of high purity magnesite was located, and production of tonnage quantities of ground Baymag magnesite suitable for use as a paper filler was achieved. Development of this source of magnesite and its processing and paper making are collaborative efforts between Philip Morris and Ecusta under a confidentiality agreement. One U.S. patent on the use of magnesite has been issued to PM, and a second patent application is pending.

Using mill run quantities of experimental magnesite papers produced at Ecusta for the first time in February, 1991, extensive investigation of the effects of various chemical additives was conducted to optimize the available papers with respect to sidestream reduction and subjectives. Additives investigated included monobasic and dibasic potassium and sodium salts of organic and inorganic acids; combinations of salts; and combinations of salts with organic acids and/or sucrose, glucose or fructose. Unlike calcium carbonate papers, it was demonstrated that there was no dependence of sidestream reduction on type of potassium salt or potassium level (except for monobasic potassium phosphate). Much of the latest model development has centered on the use of potassium succinate as the sole additive at 4.5 - 6.0% levels. For the available magnesite papers the extent of sidestream reduction has been greatest for the ternary filler paper (~61-68% reduction) and ranges from ~50-57% for the 55 g/m^2 binary filler papers, with less porous versions performing better. The original 45 g/m^2 binary paper performed as well as the 55 g/m^2 binary paper since it was somewhat less porous.

Problems with trace organic contamination of the available papers required that additional ground magnesite filler be prepared and mill run quantities of paper be re-made at Ecusta. Development of methods of analysis, mill cleaning, grinding trials, trace analyses, etc., spanned several months. The second mill run at Ecusta, using magnesite free of organic contamination, was conducted in October, 1991. The specifications for these papers were targeted to reproduce the initial papers and particular emphasis was placed on preparation of the 45 g/m^2 binary paper, at a higher total filler level, since this particular paper was expected to give the best balance of

sidestream reduction and subjective response. In general, sidestream reduction and subjective response from cigarette models prepared with the second mill run papers proved to be similar to models made with the first papers. Analyses of the second mill run papers have led to their successful qualification for outside testing.

Further subjective improvements to cigarette models are being sought through blend, filter and flavor development, based on recommendations from the project Magic team. From the many cigarette models examined to date, it is expected that a functioning prototype cigarette with a delivery range of 9-12 milligrams of tar should be available for outside testing by the end of the first quarter of 1992. However, the **most critical challenge** in the coming year will be to move a 45 g/m^2 binary magnesite paper (such as P1TY) or another similar paper forward from the status of an experimental mill run paper to a true production paper should such a move be warranted based on subjectives. An aggressive plan will have to be developed to meet this challenge.

b. Tactics and Timetable

(1) Examine various blends: Marlboro filler, Virginia Slims Super Slims filler, and three blends prepared by the Leaf Department (316, 317, 318) which feature #8 bright and #8 burley and are devoid of RLB. Select the preferred blend from this group for further evaluation.

(2) Evaluate four flavor systems prepared by Flavor Development and optimize for the preferred blend as selected in "1" above.

(3) Examine a limited number of sizings: potassium succinate, potassium citrate/sucrose/citric acid, and potassium citrate/sulfuric acid.

(4) Perform initial evaluation of a hand-attached dual concentric filter.

c. Resource Allocations

Paper Technology

Professionals

Gordon Bokelman	0.50
Sue Tafur	0.30

	Barbro Goodman	0.20
	Bob Rogers	0.025
	Navin Gautam	0.025
Technicians		1.00
Flavor Technology		
Jim Pflueger		0.15
Chemical Research		
John Paine		0.05
Jay Fournier		0.05
Ken Podraza		0.05
Jeff Seeman		0.05
Cigarette Development		
Linda Wettle		0.05
Janet Spruill	0.05	
Filter Development		0.10
ARD		0.05
CTSD		0.05
Semiworks		0.05
Totals		2.70

3. Strategy Number 3 - Develop low sidestream papers based on synthetic magnesite and compare these papers to comparable papers containing Baymag magnesite.

a. Status

During 1991, intense work has been devoted to the examination of both mined (not to be discussed in detail in this section) and synthetic magnesite in

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the low sidestream program. In 1991, optimum conditions were determined for the synthesis on a commercial scale of magnesite. Currently, production runs at Pressure Chemical to produce ca. 200 lbs. of material are in progress. In addition hand sheet work is in progress to determine conditions for running paper at the University of Maine which will be done once the synthesis is complete. These University of Maine papers will be used to compare cigarettes made from synthetic and mined magnesite.

b. Tactics and Timetable

(1) Complete the preparation and qualification of ca. 200 lbs synthetic magnesite at Pressure Chemical - February, 1992.

(2) Prepare synthetic magnesite cigarette paper at the University of Maine based on hand sheet data - March, 1992.

(3) Compare machine-made prototypes using these papers to prototypes made using Baymag magnesite paper - Second Qtr., 1992.

c. Resource Allocations

4. Strategy Number 4 - Develop low sidestream papers based on crystalline composites containing hydromagnesite and brucite (i.e., aqueous non-sol-gel process).

a. Status

During the past year a synthetic procedure has been optimized to produce hydromagnesite/brucite composites which have excellent paper making properties. Cigarettes hand-made from papers containing this material as an inorganic filler in conjunction with calcium carbonate gave excellent visible sidestream reduction with an acceptable ash. To improve the process for commercial synthetic development, work was successfully completed with the use of USP grade Reheis magnesium hydroxide in the paste form. Reaction temperature and heating rate were optimized as well. The composition of the chosen material is a 50:50 aggregate of hydromagnesite/ brucite. Tactics outlined below describe the necessary steps to be able to investigate the possible utility of this composite for a commercial low sidestream product.

b. Tactics and Timetable

(1) Select and put under contract a vendor for the preparation of ca. 200 lbs. of a hydromagnesite/brucite composition produced by the aqueous non-sol-gel process - February, 1992.

(2) Complete the preparation and qualification of ca. 200 lbs synthetic hydromagnesite/brucite composition (aqueous non-sol-gel) at selected vendor - Second Qtr., 1992.

(3) Carry out hand sheet work to determine specifications to be used to make papers at the University of Maine - Second Qtr., 1992.

(4) Prepare cigarette paper at the University of Maine using synthetic hydromagnesite/brucite composition (aqueous non-sol gel) - Early Third Qtr., 1992.

(5) Evaluate machine-made cigarettes using papers containing synthetic hydromagnesite/brucite composition (aqueous non-sol-gel) for subjectives and sidestream smoke reduction - Third Qtr., 1992.

c. Resource Allocations

5. Strategy Number 5 - Develop low sidestream papers based on amorphous forms of magnesium carbonate (sol-gel process) using material which can be scaled up to produce commercial quantities.

a. Status

During the past year, a considerable amount of effort was devoted toward optimizing the synthetic procedure to produce mag carbonate compositions using the aqueous sol-gel procedure (i.e., hydromagnesite solubilized with carbon dioxide in water followed by magnesium fortification with magnesium acetate and precipitation with potassium hydroxide). Materials obtained have adequate paper making properties, the cigarettes from which gave excellent visible sidestream reduction with an acceptable ash. The best results were obtained when the mag carbonate filler was admixed with calcium carbonate. Additional work is in progress attempting to optimize paper making properties.

In the last few months, the synthetic procedure has been varied systematically to modify the composition of the product (i.e, the ratio of hydromagnesite to brucite) as well as to improve the paper making properties of the compositions. The variables under study include temperature, pH in the precipitation step, the mole ratio of magnesium acetate, and the rate of stirring.

b. Tactics and Timetable

(1) Finalize reaction conditions (composition of starting reagents, stirring rate, temperature, pH) in the aqueous sol-gel procedure to obtain particles which have improved paper making properties - Second Qtr., 1992.

(2) Validate the sidestream reduction, subjectives, and ash quality of the replicated process materials in cigarettes made using hand sheets containing material prepared under conditions giving optimum paper making properties - Second Qtr., 1992.

(3) Select a vendor for the preparation of ca. 200 lbs. of a hydromagnesite/brucite composition produced by the aqueous sol-gel process (Reheis paste as starting material) - Third Qtr., 1992.

(4) Complete the preparation and qualification of ca. 200 lbs synthetic hydromagnesite/brucite composition (aqueous sol-gel) at selected vendor - Third Qtr., 1992.

(5) Prepare hand sheets using initial quantities of synthetic materials in order to design optimum conditions for production of paper at the University of Maine - Third Qtr., 1992.

(6) Prepare cigarette paper at the University of Maine using synthetic hydromagnesite/brucite composition (aqueous sol-gel) - Fourth Qtr., 1992.

(7) Optimize machine-made cigarettes using University of Maine paper containing the synthetic hydromagnesite/brucite composition (aqueous sol-gel) for subjectives and sidestream smoke reduction - First Qtr., 1993.

c. Resource Allocations

6. Strategy Number 6 - Develop low sidestream papers based on calcium carbonates with rhombohedral morphology.

a. Status

In 1991, it was recognized that two preparations of calcium carbonates (a sol-gel route and a classical synthesis) resulted in crystalline materials have a rhombohedral morphology. Both of these materials, when incorporated into cigarette paper, were found to lead to improved visible sidestream reduction over all previously used calcium carbonate fillers except for Multifex. These results led to the decision to investigate calcium carbonates with morphologies different from those traditionally used (i.e., Albacar which is scalenohedral and Multifex MM which is pseudo spherical). It was also recognized that ground calcium carbonate would cleave along a rhombohedral face, leading to rhombohedral (like) materials.

A number of commercially available ground calcium carbonates as well as a synthetic rhombohedral calcium carbonate were obtained. Handsheets were prepared using these materials as the sole filler, and cigarettes were made and some were evaluated. Handsheets for a number of ground calcium carbonates (commercially available: Microna 3, 7 and 10) gave 46%, 52%, and 63% visible SS reduction respectively with acceptable ash quality. These results, particularly the last, are quite good for full circumference cigarettes. A number of these materials were selected and shipped to the University of Maine to make paper. This paper is currently being used to machine-make cigarettes which will be evaluated for sidestream reduction and subjectives. In addition, some of these materials may be quite interesting in combination with magnesite and other mag carbonate fillers..

b. Tactics and Timetable

(1) Complete the identification of various commercial and synthetic forms of calcium carbonate, hand-make cigarettes using these materials, test sidestream reduction, screen subjectives, and choose the best candidates for large scale production and evaluation - Second Qtr., 1992.

(2) Prepare cigarette paper at the University of Maine using commercially obtained calcium carbonates selected based on (1) above as the sole filler - Second Qtr., 1992.

(3) Prepare cigarette paper at the University of Maine using commercially obtained calcium carbonate selected based on (1) above admixed with magnesite and, if appropriate, other magnesium-containing fillers - Third Qtr., 1992.

(4) Prepare cigarette paper at the University of Maine using commercially obtained calcium carbonate selected based on (1) above for the Superslims program - Third Qtr., 1992.

(5) Develop commercially viable methods for the preparation of selected calcium carbonate if needed - Third Qtr., 1992.

c. Resource Allocations

7. Strategy Number 7 - Utilize the sidestream chamber to fully characterize the analytical chemistry of sidestream smoke from appropriate prototypes.

a. Status

The analytical capabilities of the sidestream chamber continued to expand during 1991. Improvements in the methods of analysis of ammonia, aldehydes and acrolein, nicotine, gas phase compounds, and aerosol particle size distributions were made. The headspace gc/ms instrumentation was brought into full utilization. It was used to conduct analyses of selected gas phase compounds and, in conjunction with CAD personnel, was used in a number of studies to attempt to determine the chemical differences in the sidestream smoke from different models. Evaluations in the sidestream chamber included a comparison of a new single wrap Superslims model with the original double wrapped version; a study (conducted under both static and dynamic smoking conditions) of cigarettes prepared for simultaneous analytical and subjective comparison; two multiple smokings in support of Biochemical Research Division studies; and a continuation of a study using IM13 cigarettes to determine confidence limits of analytical methods.

New instrumentation was purchased to allow the measurement of smaller particles in the determination of sidestream smoke particle size distributions.

A mainstream carbon monoxide and carbon dioxide analyzer was added to the chamber smoking machine, and improvements in the recording and handling of data from chamber instrumentation were implemented.

b. Tactics and Timetable

(1) Conduct chamber analyses of prototype models from Product Development - Continuing.

(2) Bring the new particle size instrument into full operation.

(a) Perform a comparative study of the results produced by the two size distribution instruments - Second Qtr., 1992.

(b) Build a data base of particle size vs. mass delivery - Third Qtr., 1992.

(c) Study the behavior of smoke aerosols over extended time periods - Fourth Qtr., 1992.

(3) Bring the new Coresta prototype smoking machine into full operation - Second Qtr., 1992.

(a) Test the operation of the new machine and train operator(s).

(b) Install the new machine in a conditioned laboratory.

(c) Perform comparative studies against the 5-port Coresta prototype smoking machine.

(d) Retire the five-port machine once the new machine is fully operational.

(4) Develop a new sulfur detector for the sidestream chamber.

(a) Order and install for use with the sidestream chamber - Second Qtr., 1992.

(b) Identify and train operator(s) - Second Qtr., 1992.

(c) Use for the identification of sulfur containing compounds in sidestream smoke - Continuing.

(5) Order and install a second headspace gc/ms - Third Qtr., 1992.

(6) Reduce operation of the headspace gc/ms method to standard method status in cooperation with CAD - Fourth Qtr., 1992.

c. Resource Allocations

8. Strategy Number 8 - Elucidate the chemistry of the pyrolysis/combustion of cigarette paper as a function of additives, temperature, etc.

a. Status

The results of a Box-Behnken study conducted with the National Renewable Energy Laboratory (NREL) quantified the effect of potassium ion concentration, pH, and pyrolysis temperature on cellulose and paper pyrolysis product distribution. Differences in the product mix resulting from different additives to papers are believed to affect subjectives. The work was done using molecular beam mass spectrometry to evaluate the pyrolysis and combustion product mix for flax samples and high basis weight paper samples to which three levels of mono potassium phosphate were added at three pH levels (3, 4.4, and 9). The pH 9 level is equivalent to dipotassium phosphate. Results showed that three main product slates were a direct function of pH, potassium ion concentration, and temperature. These three principal classes of compounds are anhydro sugars, carbonyl compounds, and furan-type compounds. The data generated to date by this work are considered by patent counsel to be sufficient to support our patent claims for PM 1393. This patent is for the high basis weight paper which will be used for the single wrap Virginia Slims Superslims. Additional data also indicate that there is an interaction between the phosphate and the calcium carbonate which affects the products formed when the paper is burned or pyrolyzed. The effect depends on the amount of oxygen present.

b. Tactics and Timetable

The following outline gives a brief description of the work to be done at

NREL in 1992. Samples will be provided by Philip Morris. Pyrolysis-mass spectral analyses and data reduction by multivariate analyses will be performed at NREL.

(1) Pyrolysis and combustion of selected paper samples using temperatures ranging from 480-650°C - second quarter, 1992.

(2) Pyrolysis and combustion of phosphate treated papers at different oxygen levels - second quarter, 1992.

(3) Perform collision induced decomposition on selected nominal m/z values of interest under conditions of particular interest as determined jointly by PM and NREL researchers - third quarter, 1992.

(4) Quantitate selected compounds from key experiments - third quarter, 1992.

(5) Evaluate the effect of divalent metal ions on the pyrolysis and combustion of selected flax and paper samples - third quarter, 1992.

(6) Analyze model compound in "cracking" study molecular beam mass spectrometry - fourth quarter, 1992.

(7) Carry out detailed studies of the pyrolysis of ^{13}C-labelled cellulose in order to elucidate the mechanism of its pyrolysis under conditions relevant to cigarette paper pyrolysis - first quarter, 1992.

c. Resource Allocations

Professionals	0.50
Technicians	0.25
Total	0.75

D. Resource Allocations for Reduced Sidestream

Professionals	11.55
Technicians	4.65
Total	16.20

III. Reduced Sidestream Irritation (Strategic Goal Number 3)

A. Objective - Initiate studies to assess feasibility of reducing the levels of those chemical classes in sidestream smoke which are most likely to contribute to irritation by the fourth quarter of 1992.

B. Introduction and Status

Sensory evaluations of cigarettes conducted at Peryam and Kroll have shown that, in addition to reduced sidestream visibility and odor intensity, some low sidestream models with high basis weight calcium carbonate paper, were judged to have reduced irritation as well. As a consequence of this finding, and effort was initiated to determine analytical differences in the sidestream smoke between these cigarettes and conventional controls. Preliminary results have indicated that there are quantitative differences in the composition of the gas phase of the test cigarettes relative to the controls, and that these differences may indeed relate to the observed difference in irritation.

Based on these results and interpretations cited above, a program has been initiated to determine if sidestream irritation can be decreased by the use of selected inorganic fillers in papers, and if it is feasible to describe physical properties of these fillers which will alter sidestream smoke properties in a predictable manner. Initial commitments of this program for 1992 are to complete the analytical studies to determine the chemical differences between selected models, to determine the potential relevance of these differences to sidestream "irritation," and to initiate pilot studies to assess the feasibility of reducing the levels of those chemical classes in sidestream smoke which are most likely to contribute to irritation. To do this it is necessary to develop analytical procedures to determine compositional differences between control and reduced sidestream cigarettes which might relate to differences in irritation, and to develop methodology to measure "irritation." Additionally, a 1992 commitment was made to initiate studies to "assess the feasibility of reducing the levels of those chemical classes in sidestream smoke which are most likely to contribute to irritation," which will be done using a model system.

Four strategies have been formulated to achieve the objective. These four strategies are:

1. Identify probable chemical and perceptual causes of sidestream irritation.

2. Develop analytical methodology to determine compositional differences between selected test cigarettes and controls and to relate the differences, if possible, to known irritants or classes of irritants.

3. Devise methodology to assess the feasibility of reducing the levels of those chemical classes in sidestream smoke which are most likely to contribute to irritation.

4. Identify probable chemical and perceptual causes of sidestream irritation.

Each of these strategies will be discussed in detail below.

C. Strategies

1. Strategy Number 1 - Identify probable chemical and perceptual causes of sidestream irritation.

a. Status

Sidestream irritation is a complex issue in that it is confounded by physical, chemical, and psychological components. A clear understanding of the interplay of these components is required for the successful accomplishment of the aims of this program. Such an understanding must start with the development and use of sensory measurements of sidestream smoke in order to develop an understanding of the relationship between sidestream smoke chemistry and perceived irritation. In addition, it is essential to learn as much as possible about which compounds in sidestream smoke are likely to be irritants. A literature search on known irritants is in progress, and compounds identified in this search will be cross-correlated with known sidestream smoke components. Some work will also be done to attempt to determine if the level of any given irritant in sidestream smoke is sufficient to elicit a response.

b. Tactics and Timetable

(1) Conduct literature search on sidestream smoke components relative to irritation - First Qtr., 1992.

(2) Develop "first generation" methods and protocols to investigate sidestream smoke irritation with qualitative and quantitative endpoints - Second Qtr., 1992.

(3) Determine the feasibility of constructing an in-house facility, i.e., eye "sniff-port", to study sensory properties of individual sidestream smoke components - Second Qtr., 1992.

(4) Generate and analyze specific analytical data in relation to information obtained from literature search and external expertise - Third Qtr., 1992.

(5) Evaluate the relevance of literature and analytical data to the actual irritation of sidestream smoke, i.e., is there a group of compounds present above estimated threshold levels or a large number of compounds, none of which are estimated to be present above threshold - Fourth Qtr., 1992.

(6) Determine the need to design and construct an appropriate facility or identify an appropriate facility to conduct sidestream smoke sensory studies - Fourth Qtr., 1992.

(7) Compare the relative importance of the gas phase to that of the particulate phase on sidestream smoke irritation - Fourth Qtr., 1992.

(8) Utilizing information from the literature and the above studies, generate a list of hypotheses to test the importance of various smoke components and cigarette properties to irritation - Fourth Qtr., 1992.

(9) Develop approved methodology for addition of model compounds or select portions, i.e., gas phase of sidestream smoke - Fourth Qtr., 1992.

(10) Evaluate dose response (concentration effects) to estimate threshold levels of irritants - Second Qtr., 1993.

(11) Compare the threshold levels of specific compounds against analytically determined quantities for those compounds to arrive at relative contribution to the overall irritation of smoke - Fourth Qtr., 1993.

2. Strategy Number 2 - Develop analytical methodology to determine compositional differences between selected test cigarettes and controls and to relate the differences, if possible, to known irritants or classes or irritants.

a. Status

Preliminary analytical results involved in studies designed to evaluate difference in sidestream smoke of conventional cigarettes relative to cigarettes with reduced sidestream visibility, which were also judged to have reduced irritation, indicate quantitative differences in the composition of the gas phase. It is possible that these differences may indeed relate to the observed differences in irritation. These initial studies were carried out on a reduced sidestream model (Ambrosia type) with a 45 g/m^2 wrapper containing about 11% mono potassium phosphate and 4% malonic acid to give 70% reduced sidestream and a control made in the Semiworks (10-707A paper, 11 mg tar) using the sidestream chamber. The sidestream chamber was used so that analytical and subjective data could be accumulated simultaneously. This approach turned out to be unsatisfactory. Only four cigarettes were smoked in order to give good subjective data, but four cigarettes were not sufficient to give good analytical data. In addition, the subjective data was highly variable. As a consequence further work was done in the sidestream cones located in the Analytical Research Division. Subjective differences between the sidestream smoke from the two cigarettes were confirmed both sequentially and monadically.

Following confirmation of the subjective differences between the low sidestream model and the control, fresh sidestream smoke was collected from each cigarette and the smoke was filtered through a Cambridge pad. The sidestream gas phase was cold trapped and analyzed by gc/ms. Fifteen smokings of each cigarette were carried out. Analysis of the data was carried out using a neural network. Quantitative differences were observed between the two cigarettes. The ten compounds which differed most significantly were pyridine, 2-methyl-1-octene, 3-hexen-1-yne, ethyl vinyl ketone, o-xylene, 2-butene, 1,3-pentadiene, furfural, butyrolactone, and an unresolved mixture of 1,4-hexadienal and 2-vinylpyridine. All of these compounds were at lower levels in the reduced sidestream model than in the control. Although this analysis needs to be repeated, it is encouraging that four of the compounds on this list (pyridine, o-xylene, furfural, and 2-vinylpyridine) are known irritants, while several others are members of chemical classes which are known to be irritants. Consequently, initial analytical results appear to confirm the subjective results.

b. Tactics and Timetable

(1) Develop methodology to determine the composition of sidestream gas phase for compounds containing nitrogen, sulfur, or oxygen by Gas Chromatography/Mass Spectrometry.

(a) Simultaneously analyze sidestream smoke from selected cigarette models for sulfur and nitrogen containing compounds using a Sulfur Chemiluminescence Detector (SCD) in tandem with a Nitrogen-Phosphorus Detector (NPD). Data collection, data reduction, statistical evaluation, and compound identification - Second Qtr., 1992.

(b) Analysis of oxygen-containing compounds, including ketones, aldehydes, acids, and alcohols, by an Oxygen-selective Flame Ionization Detector (O-FID).

(i) Evaluation of the performance of O-FID at vendor's application laboratory with smoke extracts and acquisition - Second Qtr., 1992.

(ii) Smoke analysis of model cigarettes, data collection, analysis, and interpretation - Third Qtr., 1992.

(2) Measure major components of sidestream gas phase, i.e. CO, CO_2, water, total hydrocarbons, etc. - Fourth Qtr., 1992.

(3) Determine the effect of inorganics in paper (including filler and fluxing agent) on sidestream smoke composition and sensory properties by evaluating low sidestream models with various fillers - Fourth Qtr., 1992.

(4) Determine temperature of a wispy "puff" of smoke plume - Fourth Qtr., 1992.

3. Strategy Number 3 - Devise methodology to assess the feasibility of reducing the levels of those chemical classes in sidestream smoke which are most likely to contribute to irritation.

a. Status

The cigarette wrapper exerts a dominant influence over the way a cigarette performs and modifications to the wrapper have been the major viable approach to sidestream smoke reduction. Based on successes with this approach in reducing sidestream visibility, it has been postulated that reduction of irritation in sidestream smoke may also be attained with appropriate modifications to the wrapper, with or without the concomitant reduction in sidestream visibility. The Peryam and Kroll experiments indicated only slight effects in irritation reduction from the models examined. The aim of this strategy is to develop systems that will provide more dramatic changes in the chemistry of sidestream smoke than that observed for the reduced sidestream models examined at Peryam and Kroll.

c. Tactics and Timetable

(1) Design and construct a reactor to evaluate thermal and catalytic cracking of model compounds and sidestream smoke fractions - Second Qtr., 1992.

(2) Develop model systems to study interactions of specific classes of compounds with certain inorganic materials - Second Qtr., 1992.

(a) Conduct a literature search to identify approved materials with reported catalytic properties for the classes of compounds that are most likely to contribute to irritation - Second Qtr., 1992.

(b) Evaluate low sidestream fillers, fluxing agents, and interaction products of these with each other and with cellulose, i.e., char for catalytic activity with model compounds representing chemical classes related to irritation - Fourth Qtr., 1992.

(3) Prepare low sidestream cigarettes with magnesite and hydromagnesite/brucite fillers at optimum reduced visibility levels and evaluate these sensorially for irritation and analytically for compositional differences - Fourth Qtr., 1992.

(4) Conduct imaging studies on magnesite and hydromagnesite/ brucite cigarettes - Fourth Qtr., 1992.

(5) Identify inorganic materials with potential for catalysis and evaluate the effect of physical properties, i.e., morphology, particle size,

surface area, as well as chemical and thermal properties on catalytic function - 1993.

(6) Using model compounds and selected smoke fractions, evaluate catalytic and thermal effects of candidate catalysts under conditions extant in the burning cigarette, and characterize products both analytically and sensorially - 1993.

(7) Develop appropriate facilities, methods, and protocols to conduct sensory evaluations of products from thermal cracking studies - 1993.

4. Strategy Number 4 - Develop a definition of what irritation (eye, nose, etc.) means to the smoker and non-smoker.

a. Status

The development of a program to address sidestream smoke irritation requires a clear definition of the type of irritation that is of interest to the consumer. Although the subject of irritation is not new, the concept of providing product benefits through reduced sidestream smoke irritation merits careful reflection of the specific issue to be addressed and how. Most of the literature on irritation relates to chemical irritants and pharmacological applications, indirectly relate to tobacco. There is some literature, mostly in publications from a competitor's laboratories, which describes techniques to evaluate eye irritation relative to cigarette smoke.

c. Tactics and Timetable

(1) Review the literature, PED studies, and Marketing Research (N.Y.), and obtain external expertise regarding sidestream irritation - Second Qtr., 1992.

(2) Other tactics to be developed - First - Fourth Qtr., 1992.

D. Resource Allocations

PM resources

Chemical Research	4.5
Analytical Research	1.5

PED	To be determined
Paper Technology	0.5
NY Polytechnic	1
Total	7.5 plus PED

IV. Project Tomorrow (Strategic Goal Number 4)

A. Objective - To develop procedures for the application of transverse bands to cigarette paper in order to control burn rate by January, 1993.

B. Introduction and Status

It was shown some time ago that a Kimberly-Clark patented paper made by affixing small bands of a dense paper to normal cigarette paper resulted in cigarettes which would self-extinguish when the char line reached the band. Kimberly-Clark was unable to develop an actual device which would accomplish this objective. Such a device was designed and built by PM USA R&D and Engineering personnel, however, and this device, the strip applicator unit, is currently operational. In addition, a prototype strip applicator unit which is designed to run at faster speeds is being built at Molins. A patent on the strip applicator unit was filed on October 30, 1990, and notice of allowance was received on December 23, 1991.

There are many problems associated with the strip applicator concept, however, particularly problems in making the paper at high speed, and the effect of such paper on current cigarette making machines. As a consequence, several approaches have been looked at to apply some type of transverse bands to cigarette paper. One such approach is the "daubing dandy." The original daubing dandy concept consisted of a modified dandy roll designed to apply intermittent layers or bands of cellulose across the wet base web on a paper machine. The concept was reduced to practice at the University of Maine, and papers were prepared there using both hardwood pulp, Cellulon, and Buckeye "expanded fiber." Cigarettes were produced with the hardwood banded paper which exhibited the desired burn rate control. A patent application, PM 1429, was filed in November, 1990. Because of the mechanical complexities involved in wet-end modification of a paper machine, support was obtained from PM Engineering to scale up the daubing dandy concept. Beloit Corporation was contacted to evaluate approaches developed by PM Engineering suitable for achieving this objective. Two prototype devices were tested at Beloit, and one of these, the moving orifice device, gave promising results. However,

since complete coverage was not obtained using this device in two trials, a moving orifice device was recently installed in the Filter Development Lab.

A second approach is the application of a cellulosic material to the paper off-line through the use of a rotogravure-type printing technique. Avicel, a microcrystalline cellulose, was successfully applied using CMC as a binder with a modified rotogravure roll. Two other materials, Cellulon and Buckeye's "expanded fiber," have also been investigated. Due to the unique properties of these materials, they have the ability to bind to paper without an adhesive. Because of their fibrous character, however, they require modification in order to apply a rotogravure-type technique. Extrusion-type, spray or ink jet techniques have been found to be suitable for processing these materials, and the appropriate equipment has been evaluated. Patent application PM 1479 was filed in September 1991. Control of burn rate has been achieved using this technology, and commercialization efforts with Kimberly-Clark are under way.

As is obvious from the above discussion, there are three major strategies still being pursued by the Paper Technology Program for Project Tomorrow. These are:

1. Design and construct modifications to a paper making machine which will allow the application of cellulosic bands to paper at or near the wet end.

2. Explore the application of bands of cellulose to cigarette paper using either rotogravure or extrusion-type techniques.

3. Complete the development and evaluation of a prototype device to apply bands of dense paper to cigarette paper.

Each of these strategies will be discussed in detail below.

C. Strategies and Tactics

1. Strategy Number 1 - Design and construct modifications to a paper making machine which will allow the application of cellulosic bands to paper at or near the wet end.

a. Status

The initial evaluation of a rotogravure type band application positioned above the couch roll on Beloit's pilot paper machine was partially successful. Band contrast was acceptable, the band remained intact through the press

section, and the device did not interfere with the operation of the paper machine. Unfortunately, the level of application was low, and uniformity within the banded region was unacceptable.

Exploratory work at Bryce-Jewett under the supervision of PM Engineering resulted in the development of a slurry application device (moving orifice) that can apply bands by spraying the slurry. The moving orifice device was successfully operated at production speed using a moving belt.

In October 1991, pilot trials were completed at Beloit using both the moving orifice and the rotogravure banded devices. Modifications to both the slurry and the rotogravure banded device (inclusion of CMC and noncontinuous grooves respectively) did not substantially improve the apparent level and quality of Cellulon bands. Cellulon was successfully applied using the moving orifice device. Sheet formation is apparently unaffected by the jets of slurry if the wet line is maintained well before the application device.

The resulting banded areas applied with both devices do not restrict porosity. This is apparently in direct conflict with the measured flow of Cellulon applied with the moving orifice (up to 4 g/m^2 Cellulon in the banded region). It appears that the correct amount of Cellulon was applied but a large portion of the slurry was removed by the press felts (~75%). Analysis of the quantity of dye added to the Cellulon (measuring the fluorescent component of brightness) confirmed that only a fraction of the Cellulon applied remained on the sheet after the press section. This contention is also supported by the observed fluorescence of the felts after running slurry containing the fluorescent dye. There was also a cross-directional gradient in application level.

The amount of Cellulon that did remain on the sheet should have measurably reduced the sheet's porosity. It is not known if the moving orifice's initial application was poor or if removal by the felt disrupted the surface. The moving orifice will be installed on a conveyor in the Filter Development area to determine the slurry characteristics required for successfully application. The conveyor can apply slurry to dry cigarette paper to evaluate coverage (amount, contrast, effectiveness). Once a satisfactory slurry is developed, the device will be installed on a pilot paper machine with the same press configuration as a commercial cigarette paper machine (no top

felt). It should be noted that a decision has been made to cease all work with Cellulon both because of its high projected cost and lack of FDA approval. Consequently, developing a suitable slurry will also involve finding an adequate substitute for Cellulon.

b. Tactics and Timetable

(1) Develop testing procedures for evaluating slurry properties - March 1992.

(2) Evaluate the performance of the moving orifice using the conveyor assembly at Philip Morris - April, 1992.

(3) Determine cost and feasibility of modifications to Beloit machine - 1st Qtr., 1992

(4) Evaluate cigarette papermaking capabilities at Herty - June, 1992.

(5) Develop the capability to apply bands on cigarette paper at Herty - Sept., 1992.

(6) Evaluate the impact of banded papers on cigarette properties - December 1992.

c. Resource Allocations

Professional	0.5 man-years
Technicians	0.5 man-years

Contractual research facilities. (Herty Research and Beloit)	$91,200

2. Strategy Number 2 - Explore the application of bands of cellulose to cigarette paper using either rotogravure or extrusion-type techniques.

a. Status

This concept utilizes bands of cellulosic materials applied transversely to the dry paper by various printing techniques. The benefits and risks of this approach are similar in nature to Strategy Number 1, band application on the wet end of a paper

machine. Three techniques have been evaluated; rotogravure, ink-jet printing, and an extrusion-type application technique suggested by Nordson Corporation. The rotogravure-type method has shown promise. Work has been discontinued on both the ink-jet printing device and the extrusion device, as they would involve considerable development work. The moving orifice device is well suited for dry-end application, however, as well as wet-end application; consequently, that device will also be utilized to apply bands of cellulosic slurries to paper web.

A modified gravure roll was designed in conjunction with PM Engineering. It was demonstrated that this roll has the ability to transfer bands of cellulosic materials to 137-1 paper. The definition of bands applied by this method is reasonably good. A patent application, PM 1479, has been filed to cover the use of bands of cellulose applied to the surface of cigarette papers by coating or printing techniques. The types of cellulosic materials claimed are microcrystalline cellulose, Cellulon, and microfibrillated cellulose. A confidentiality agreement with Kimberly-Clark has also been obtained to facilitate future development work on this approach. The efforts in this concept have been concentrated on the application of colloidal cellulose.

The type of colloidal cellulose used is a form of microcrystalline cellulose (MCC) of very fine particle size (70% particles less than 0.2 μ). This material, Avicel CL-611, is co-processed with CMC (85% MCC +15% CMC) which serves to stabilize the colloidal suspension. According to FMC Corp., the manufacturer of this material, the level of CMC in Avicel CL-611 could be reduced if desired. PM has obtained a confidentiality agreement with FMC.

Colloidal cellulose has also been successfully applied to 137-1 paper by a rubber covered modified gravure roll. The depth of grooves in the roll and slurry concentration can be changed to achieve the desired level of application. On 137-1 paper, about 3.5-4 g/m² addition level in the bands appears to achieve the desired objective. The performance of cigarettes made from papers submitted by KC (3 levels of application) is encouraging. Additional papers have been requested from KC to optimize the application level.

b. Tactics and Timetable

(1) Obtain banded papers from KC at various levels of application in the bands - March, 1992.

(2) Evaluate the use of the moving orifice device for Avicel application - Second Qtr., 1992.

(3) Evaluate cigarettes with these papers for zone-specific burn rate modification - June, 1992.

c. Resource Allocations

Professionals and Technicians 1.00

3. Strategy Number 3 - Complete the development and evaluation of a prototype device to apply bands of dense paper to cigarette paper.

a. Status

A Strip Application Unit was fabricated by Jewett Automation in late 1990 and transferred to R&D. The past year a great deal of effort was expended to modify this prototype machine and convert it into one suitable for development purposes. We have recently been able to begin providing bobbin quantities of banded papers for evaluation by Project Tomorrow personnel. Efforts are continuing to identify approved adhesives for use and samples have been solicited.

Approximately one year ago, PM Engineering requested Molins to produce a "proof of concept" test rig capable of making banded papers at production speeds with acceptable quality attributes. R&D's role has been to transfer information gained from our experience with running and modifying the Strip Application Unit. We have also evaluated the banded papers produced by Molins on their machinery for compliance with the specifications transmitted to them.

Bobbin quantities of banded papers, produced by both PM and Molins, are currently scheduled for cigarette making trials in the R&D Semi-Works. The cigarette making process will be closely observed to ascertain if any runnability issues exist with these types of cigarette wrappers.

c. Tactics and Timetable

(1) Complete initial cigarette making trials - Feb., 1992.

(2) Carry out adhesive evaluations - Second Qtr., 1992.

(3) Carry out paper evaluations, as requested by Project Tomorrow personnel.

(4) Investigate alternate paper widths and spacings, as requested by Project Tomorrow personnel - Fourth Qtr., 1992.

c. Resource Allocations

Filter Technology 0.1

V. Cigarette Paper Specifications/Quality (Strategic Goal Number 1)

A. Objective - To determine those cigarette paper parameters which most affect cigarette performance and manufacturing processes and set meaningful specifications and tolerances for cigarette papers.

B. Introduction and Status

At present cigarette paper specifications can be divided into three separate types: 1) parameters which affect cigarette performance, e.g., paper porosity; 2) properties which affect cigarette making, e.g., tensile strength; and 3) properties which affect cigarette appearance, e.g., paper opacity. Recent studies have shown that there are at least four paper properties which affect cigarette performance; namely, porosity, level of citrate, level of calcium carbonate, and basis weight. Although we have specifications for all of these, only two of them - porosity and basis weight - are routinely monitored. Calcium carbonate was not defined as a critical parameter. Moreover, studies had not been carried out to establish appropriate tolerances to ensure that cigarette deliveries and puff counts are within specifications. In the case of calcium carbonate level, the importance was not previously known. The studies discussed below will provide information for establishing meaningful paper specifications.

A study was carried out to determine the effects of paper properties on the performance of cigarettes, particularly in terms of tar delivery and puff count. The properties of interest were basis weight, chalk content, porosity, and citrate level. The basis weight ranged from 25 to 35 grams per square meter; the chalk content ranged from 25 to 37%; the porosity ranged from 13 to 46 Coresta; and the citrate level ranged from 0.6% to 2.6%. The effect of using Multifex chalk was also investigated. Of the 33 papers required, Kimberly-Clark had base papers available for 24, and only coating with the

appropriate level of citrate was necessary. Five mill runs followed by citrate application gave the remaining nine papers. The somewhat surprising result of this study was that the chalk level affects tar delivery as much as the porosity of the paper.

The two strategies which will be pursued to continue these evaluations are:

1. Evaluate the effects of paper properties on cigarette performance attributes (puff count, tar, static burn time, etc.) in order to determine whether tolerances on paper specifications are appropriate for Marlboro or other full flavor cigarettes, including determination of paper uniformity requirements for the product.

2. Evaluate the effects of paper properties on cigarette performance attributes (puff count, tar, static burn time, etc.) in order to determine whether tolerances on paper specifications are appropriate for low delivery cigarettes.

C. Strategies and Tactics

1. Strategy Number 1 - Evaluate the effects of paper properties on cigarette performance attributes (puff count, tar, static burn time, etc.) in order to determine whether tolerances on paper specifications are appropriate.

a. Status

Data generated from this study were statistically analyzed with the goal of establishing the nature of the relationship between the physical paper parameters studied and the delivery performance of the cigarettes. A computer prediction program was created based on the statistical model. The most significant result of this analysis was the extent to which the chalk level in the paper affects the tar delivery of the cigarette.

Using the model, and changing the various paper properties, it was possible to begin to estimate which of the four parameters studied had the most significant effect on cigarette performance. The program was used to predict the tar, puff count, and static burn time by leaving three of the four parameters at the level in the paper specification and varying the fourth parameter incrementally over the range allowed by the specification. The model predicted that varying the basis weight or the citrate level over the specification ranges had very little effect on the performance when the other parameters are on the specification target. Varying the chalk content in the same way had the greatest effect on tar delivery with porosity held constant.

With all other paper parameters at specification and chalk content at the lowest level allowed by the specification, the program predicted that the tar delivery of Marlboro KS cigarettes will be 16.5 mg, within the range of the one-week average. At the highest level allowed by the spec, 37%, the predicted tar delivery is 15.3 mg, below the lower tar limit for one-week or running eight-week averages. Another surprising discovery of the analyses was that the predicted tar delivery was not a linear function of the chalk content: tar deliveries changed more with incremental changes in chalk content at the low end of the chalk range than at the high end. The effect of chalk reaches a plateau above about 30%.

In the paper-making process, the level of chalk used is often directly related to the porosity of the finished paper, at a given level of stock refinement. It is known that our paper suppliers generally vary the amount of chalk used in the paper-making process to manufacture cigarette paper within the allowable range for porosity. This study indicates that the chalk level may be as important as the porosity in determining cigarette performance, within the operating windows in which our vendors normally run their processes. Further testing is necessary to confirm this.

A cross-functional team has been formed working with QA, Purchasing, Manufacturing Services, Operations Services, and Supply Chain personnel to integrate these efforts.

b. Tactics and Timetable

(1) Obtain pallet uniformity requirements for Marlboro wrapper - February, 1992.

(2) Determine porosity changes needed to effect tar changes with chalk held constant - March, 1992

(3) Based on recommendations, propose changes required of vendors - April, 1992.

(4) Determine vendor process capabilities to control calcium carbonate - June, 1992

(5) Prepare and publish report - Third Qtr., 1992.

2. Strategy Number 2 - Perform the same evaluations for low delivery cigarettes using Marlboro Ultra Lights and Marlboro Lights as the cigarette prototype.

Tactics and Timetable

a. Submit cigarette requests - December, 1991.

b. Obtain CI data. February -1992.

c. Evaluate data statistically - April, 1992.

D. Resource Allocations for Specifications (Quality) Project

Professionals		0.75
Technicians	0.25	
Total		1.00

VI. Cigarette Paper Specifications/Cost (Strategic Goal Number 1)

A. Objective - To consolidate three grades of 46 Coresta flax papers with elevated citrate levels used in manufacturing to one grade.

B. Introduction and Status

The design of low and ultra low delivery cigarettes has previously required the use of a high porosity paper with high levels of citrate (2.0 and 2.6%) to achieve the low puff counts desired for such products. Previous development work has shown that increasing the basis weight and/or the calcium carbonate content of the cigarette paper can be used at lower citrate levels to achieve low puff counts. For the Merit Ultima program, a paper was developed with a porosity of 46 Coresta units, a basis weight of 28 g/m^2 , a 36% calcium carbonate content, and a 1.7% citrate level which was found to give superior analytical and subjective smoking performance to 25 g/m^2 papers with elevated citrate levels. With the introduction of the 28 g/m^2 grade, we now use three grades of 46 Coresta papers with elevated citrate levels for a number of domestic and export products.

For consolidation to one grade, several items must be taken into consideration. Since 10-058A, the 28 g/m^2 paper, offers unique performance advantages for ultra low delivery cigarettes that the other two grades do not give, it would be the grade of choice. The machining performance of 10-058A during production of Merit Ultima, Cambridge

Lowest, and Bristol Lowest has been quite satisfactory. With the higher basis weight and calcium carbonate level, the 28 g/m² paper may also offer ash flaking advantages on low delivery products. Analytical and subjective screening of Marlboro Ultra Lights 100 made with 10-058A, the 28 g/m² paper, suggests that the paper is equivalent to 10-707A (25 g/m² , 2.6% citrate) for the brand. Testing remains to be done on other brands which use the 25 g/m² grades to determine if a change to the 28 g/m² paper is acceptable.

At the same time, 10-058A is thicker in caliper than conventional paper which results in less meterage per bobbin (6000 vs. 6700 meters). Also, the 28 g/m² paper is more costly than conventional paper on a meterage basis, the basis on which cigarette costs are calculated, even though it is less costly per pound. Of course, inventory costs could be reduced by consolidating from three grades to one. The net cost effect of these factors also remains to be determined.

Kimberly-Clark has been the sole supplier of 10-058A to date, but Ecusta has produced the grade in a mill trial and submitted material for evaluation. Development of a second source of supply for the grade is desirable for both product security reasons and pricing reasons.

C. Strategies and Tactics

1. Strategy Number 1 - Quantify the cost advantages and disadvantages of consolidation of three grades to the 28 g/m² paper.

a. Tactics and Timetable

(1) Determine the direct material cost impact for converting the elevated citrate grades supplied by Kimberly-Clark to the 28 g/m² grade - March, 1992.

(2) Determine the cost savings derived from inventory consolidation from three grades to one grade - June, 1992.

2. Strategy Number 2 - Conduct cigarette evaluations to demonstrate acceptable analytical and subjective smoking performance for conversion of key brands to the 28 g/m² paper.

a. Tactics and Timetable

(1) Select key domestic and export brands for evaluation of the 28 g/m² grade - March, 1992.

(2) Determine the analytical and subjective smoking characteristics of product prototypes made with the control and test papers - June, 1992.

(3) Develop an implementation schedule for consolidation to one grade - July, 1992.

3. **Strategy Number 3 - Qualify a second source of supply for 10-058A.**

a. Tactics and Timetable

(1) Determine the analytical smoking characteristics of ultra low delivery models made with Ecusta 28 g/m² paper relative to models made with 10-058A produced by Kimberly-Clark - February, 1992.

(2) Determine the subjective smoking characteristics of the Ecusta paper relative to the KC paper - March, 1992.

(3) Conduct a preliminary factory machining evaluation of the Ecusta 28 g/m² paper - May, 1992.

D. Resource Allocations

Professionals	0.20
Technicians	0.10
Total	0.30

VII. Wood Pulp Papers (Strategic Goal Number 1)

A. Objective - Evaluate the viability of replacing flax papers with wood pulp papers for full margin bands and develop the appropriate papers.

B. Introduction

Wood pulp cigarette papers have been used extensively by cigarette manufacturers in Europe and other areas around the world for many years, while the U.S. market has remained primarily a flax paper market. The large commercial

demand for wood pulps and the relatively small demand for flax makes the latter a more costly specialty pulp. With the growth of the price/value segment of the domestic cigarette market during the 1980's, lower cost wood pulp papers began to appear on competitive discount products. In time, a number of full margin competitive brands were also converted to wood pulp papers.

PM has used wood pulp grades for Cambridge, Bristol, and other price/value products for about two years. Machining performance of wood pulp papers has generally been equivalent to that of flax papers. To properly consider application of wood pulp papers to our full margin products, we must first determine if wood pulp grades of suitable quality and consistency can be obtained to meet the analytical and subjective smoking requirements of our full margin cigarette brands. If so, testing to develop a minimum number of wood pulp grades to meet the needs of our various brands can proceed.

C. Strategies and Tactics

1. Strategy Number 1 - Determine the availability of wood pulps of sufficient quality and consistency to insure the quality of PM brands.

a. Status

Meetings were held with Ecusta and Kimberly-Clark to review their sources, specifications, and test procedures for wood pulps. In conjunction with our consultants from the University of Maine, a list of relevant analytical tests was developed for wood pulps. These tests will be conducted for samples of commercial wood pulps as well as for samples of flax pulps. Ingredients information is being reviewed by Materials Evaluation as it becomes available.

b. Tactics and Timetable

(1) Obtain a series of flax pulp samples from Ecusta and KC and a series of commercial wood pulps to analyze for chemical attributes - February-March, 1992.

(2) Complete chemical analyses on initial flax and wood pulp samples - March, 1992.

(3) Consult with pulp manufacturers to determine the additives used in producing the pulps of choice - May, 1992.

(4) Based on pulp analyses, identify two manufacturers of wood pulp papers for further testing on cigarette prototypes - June, 1992.

2. Strategy Number 2 - Determine the relationships between wood pulp paper properties such as porosity, citrate level, calcium carbonate content, and basis weight and the analytical smoking performance of cigarettes.

a. Status

For an initial comparison of wood pulp and flax papers on full margin cigarettes, wood and flax papers from Kimberly-Clark and Papeteries de Mauduit are being evaluated on full flavor cigarette prototypes. Models made in the Semiworks with all four papers exhibited slightly lower FTC tar deliveries (0.5 and 0.9 mg) for each supplier's wood pulp grade relative to the corresponding flax grade. There were no differences in puff counts or CO deliveries between the wood and flax papers. A subjective screening of the models will be conducted by the Richmond Panel.

b. Tactics and Timetable

(1) Evaluate different porosity grades of wood pulp and flax papers on full flavor and low delivery cigarette designs to compare the analytical smoking relationship with each type of pulp - April, 1992.

(2) If warranted, design a matrix test to determine the relationships between wood pulp paper properties (porosity, citrate level, calcium carbonate level, and basis weight) and the analytical smoking properties of full flavor, light, and ultra light cigarette designs - April, 1992.

(3) Produce the experimental papers required for the matrix study - May, 1992.

(4) Produce cigarette models for the matrix study and determine analytical smoking properties - September, 1992.

(5) Develop working models relating FTC tar delivery and puff count to wood pulp paper properties - October, 1992.

3. **Strategy Number 3 - Determine paper specifications for the minimum number of grades of wood pulp papers needed to meet PM brand requirements.**

a. Status

Six grades of flax cigarette papers are currently in use for the majority of our cigarette products. These grades include four porosity levels containing 0.6% citrate (22, 27, 33 and 46 Coresta) as well as two additional citrate levels (2.0 and 2.6%) for the 46 Coresta porosity. In developing specifications for wood pulp papers, we plan to minimize the number of grades while maintaining the appropriate tools to control FTC tar delivery for our cigarette products.

b. Tactics and Timetable

(1) Develop the FTC tar delivery control criteria required for the cigarette wrapper - March, 1992.

(2) Utilize the wood pulp paper cigarette design model to project paper specifications for the minimum number of papers required - September, 1992.

(3) Produce test papers at the developed specifications - October, 1992.

(4) Evaluate the analytical smoking performance of cigarette models made at different delivery levels with the specified papers - December, 1992.

(5) Issue preliminary specifications for the required wood pulp papers required - January, 1993.

4. **Strategy Number 4 - Demonstrate the parity of full margin product prototypes made with wood pulp papers versus production control models made with flax papers.**

Tactics and Timetable

a. Identify target brands for consumer product testing of flax and wood papers - January, 1993.

b. Design and fabricate prototype cigarettes to meet analytical smoking requirements - February, 1993.

c. Conduct POL testing to demonstrate subjective parity between flax and wood pulp papers - May, 1993.

d. Demonstrate acceptable machining performance with wood pulp grades - July, 1993.

D. Resource Allocation Summary for Wood Pulp Papers

Professionals
Technicians

Total

VIII. Completed Projects

Two projects which were dealt with in the previous year's Paper Technology Plan are no longer included. The first of these deals with papers designed to improve ash appearance and control puff count. Work on this project is essentially complete. The remaining effort involves carrying out studies to replace both 10-706A and 10-707A papers with the 10-058A paper. This is now included in the section on cigarette paper specifications. The other project involves tipping papers. The study dealing with filter flare-up has been completed, and low silicate, low ink weight tippings have now been implemented. Although the lip release effort has not been completed, all that can be done in this area with current materials has been done. As a consequence, a request has been made to our vendors to investigate the use of new materials for lip release.

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OPERATIONAL PLANS

FILTRATION TECHNOLOGY

1992

OPERATIONAL PLANS

WEB FILTER DEVELOPMENT

Responsible Individual: K. A. Newman

WEB FILTER MATERIALS

I. **Objective:** Develop web cigarette filtration system(s) which offer the consumer perceived benefits when incorporated into new cigarette systems.

II. **Explanatory Introduction:** Project involves the research and screening of available materials for their possible benefits in filter systems. Benefits include smoke modification, subjective modification, and/or perceived increase in value by the consumer. Project also involves the creating of new materials or combinations of materials to effect a novel material and filter system which provides positive benefits. An exclusive position for use of any materials coming from this project will be pursued.

Benefits of this project are an increase in product sales through implementation in market niches. Further benefits will be derived through the exclusive control of strategic materials and prevention of competitors' use of these materials.

III. **Strategies:**

- Develop a non-woven wet-laid sheet of cellulose acetate and cellulosic fibers. (B. Rogers)
- Develop a non-woven dry-laid sheet of cellulose acetate with or without thermoplastic bonding fibers. (K. Newman)
- Develop additives and additive application systems to modify the filtration and/or subjective performance of various web filter media. (J. Ryder)
- Develop cellulose or cellulose acetate modification processes to provide filtration and/or subjective performance advantages for new products. (B. Edwards)
- Develop manufacturing processes and operations to produce filters from new filter media. (D. Laslie)

IV. Tactics and Timetables:

Strategy I - Wet-Laid Webs

PM Web	
Conduct mill runs of PM web.	1st Quarter 1992
Evaluate consumer response to PM web filtered cigarettes.	2nd Quarter 1992
Conduct mill run of Courtaulds staple CA fibers and/or CA fibrids.	3rd Quarter 1992
Domestic Cellulose Paper	
Conduct a mill run of domestically produced Tela-type paper for use in Merit Ultima.	1st Quarter 1992
Qualify a domestic source of Tela-type filter web material.	2nd Quarter 1992
Carbon Paper	
Evaluate modified web samples of wood and wood+tobacco papers with carbon from Kimberly-Clark in PCC and dual filters.	1st Quarter 1992
Evaluate web samples of wood+carbon paper from Ecusta in PCC and dual filters.	1st Quarter 1992
Evaluate web samples of wood+carbon paper from Commercial Papers Company in PCC and dual filters.	1st Quarter 1992
General	
Evaluate modified CA web materials as they become available.	4th Quarter 1992

Strategy II - Dry-Laid Webs

Evaluate Courtaulds tencel fiber in a dry-laid hydroentangled.	2nd Quarter 1992
Evaluate Courtaulds CA long-cut fiber in a dry-laid hydroentangled web.	2nd Quarter 1992
Evaluate solvent bonded hydroentangled webs produced by Courtaulds.	3rd Quarter 1992

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Strategy III - Additives

Evaluate additives coated on PM web materials in paper core concentric and dual filters.	3rd Quarter 1992
Evaluate additives coated on Tela paper in paper core concentric and dual filters.	3rd Quarter 1992

Strategy IV - Cellulose Modifications

Determine feasibility of Courtaulds acetylated cellulose and deacetylated cellulose acetate web materials.	4th Quarter 1992

Strategy V - Process Development

Investigate the processing capabilities of Decoufle web filter making equipment.	2nd Quarter 1992
Continue development of KDF-1 web filter making process regarding dust control, plasticizing capabilities, rod quality.	4th Quarter 1992

V. Resource Allocations

		Man Years
Cigarette Technology	B. Monahan	0.10
Cigarette Technology	K. Poindexter	0.10
Filtration Technology	K. Newman	0.20
Filtration Technology	D. Laslie	0.50
Filtration Technolgoy	J. Ryder	0.10
Paper Technology	B. Rogers	0.10
Chemical Research	B. Edwards	0.10
Technology Assessment	P. Gauvin	0.10

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FILTER TECHNOLOGY

1992 OPERATIONAL PLANS

ALTERNATE PLASTICIZERS

Responsible Individual: A. L. Finley

I. **Objective:** Investigate acceptable alternative CA plasticizers to replace triacetin and investigate natural-based glycerine type triacetin as a replacement.

II. **Explanatory Introduction:** The plasticizer currently used in PM filters and in most filters throughout the industry is a mixture of triacetin made from natural-based and synthetic-based glycerine. Past studies indicate that these mixed-triacetin plasticizers are subjectively different from the 100% synthetic-based and 100% natural-based triacetin. The price and availability of synthetic-based glycerine is currently controlled by manufacturers that are active in anti-smoking advertising. It would be in our best interest to find a replacement for the synthetic-based triacetin.

Benefits - A replacement for the synthetic-based triacetin would remove control of pricing and availability out of the hands of organizations hostile to our business.

Down-Side Risks - Acceptable alternatives could result in higher costs and/or could be subjectively different from the triacetin currently in production. The probability of matching subjectives by adding components to the alternate plasticizer is low. Tobacco blend and flavor changes could be needed.

III. **Strategies:**

Conclude the studies on triethyl citrate as a substitute for triacetin. (Finley)

Investigate natural-based glycerine type triacetin as an alternative to the triacetin currently used. (Lam, Finley, Ryder, Jackson)

Screen all suggested alternative plasticizers. (Finley, Ryder, Jackson)

IV. **Tactics and Timetables:**

Strategy I - **Conclude the studies on triethyl citrate as a substitute for triacetin**

Write completion report with suggestions 1st Quarter 1992

Strategy II - **Investigate natural-based glycerine type triacetin as an alternative to the triacetin currently used**

Do subjective evaluations to compare 100% synthetic TA, 100% natural TA, and TA with specified natural/synthetic ratios.	2nd Quarter 1992
Investigate the hardness levels of filters produced with the current production plasticizer to the hardness of the 100% synthetic and 100% natural at 8% and 6% plasticizer levels.	2nd Quarter 1992
If needed, evaluate the use of additive in the natural triacetin to obtain subjective parity with current products.	4th Quarter 1992
If needed, evaluate tobacco blend and flavor system changes to obtain subjective parity with current products.	4th Quarter 1992

Strategy III - Screen all suggested alternative plasticizers

Get toxicological approval for all suggested alternatives.	As needed
Determine if the suggested alternative(s) can plasticize CA, if the requirements for tactic 1 are met.	As needed
Compare the hardness levels of current filters to the hardness levels of alternatives successfully completing tactics 1 and 2.	As needed

V. Resource Allocations

	Total Person Years
Arlington Finley	1/10 man-year
Norman Jackson	1/10 man-year
Kai Lam	1/5 man-year
Judy Ryder	1/10 woman-year

FILTER TECHNOLOGY

1992 OPERATIONAL PLANS

SELECTIVE FILTRATION / CO REMOVAL

Responsible Individual: A. L. Finley

I. **Objective:** Develop a catalyst for CO removal. Demonstrate CO catalyst feasibility for removing at least 25% of the CO in cigarette smoke. Optimize the method(s) of incorporating the resulting catalyst(s) into conventional or novel cigarette filters.

II. **Explanatory Introduction:** The state of the art CO removal catalysts are not suitable for use in cigarette filters due to low activities at room temperature and due to susceptibility to deactivation by water vapors. The catalyst for cigarette filters must have high conversion rates at room temperature, must not be adversely effected by water vapor and must be cost effective. Seton Hall University has produced a catalyst that has enhanced activity in the presence of water vapor and has produced other catalysts that are unaffected by water vapor with high conversion rates at slightly elevated temperatures.

Benefits - A CO removal catalyst that could be used in cigarettes would represent a significant scientific breakthrough. Most other industries do not have to confront the moisture and low temperature issue head-on resulting in limited work in this area. The catalyst would benefit several major programs that could produce novel cigarette constructions that have the potential of increased CO concentrations in main stream smoke. The technology would give PM a head start on complying with any potential legislation related to CO reduction.

Down-Side Risks - Developing a room temperature CO removal catalyst that is not deactivated by moisture is clearly a long range research project. Developing a catalyst that is cost effective for use in cigarettes adds another level of difficulty. The question of catalyst selectivity raises other important issues.

III. **Strategies:**

- Test CO removal catalysts supplied by Seton Hall University. (Kellogg, Finley, Hayward)
- If contract with Seton Hall University is not renewed, develop a room temperature CO removal catalyst based on work done to date at Seton Hall University. (Kellogg, Finley, Hayward, other PM personnel)

IV. **Tactics and Timetables:**

Strategy I - Test CO removal catalysts supplied by Seton Hall University

Renew contract with Seton Hall University for developing a room temperature CO catalyst for use in cigarettes.	2nd Quarter 1992
Test room temperature CO catalysts in cigarettes.	4th Quarter 1992
Test room temperature CO removal catalysts in synthetic gas stream containing CO and other gases found in cigarette smoke to test for unwanted oxidations.	4th Quarter 1992

Strategy II - If contract with Seton Hall University is not renewed, develop a room temperature, CO catalyst based on work done to date at Seton Hall University

Identify PM team to synthesize, analyze, and test potential catalyst systems.	3rd Quarter 1992
Obtain Professor Augustine as a consultant.	3rd Quarter 1992
Determine staffing requirements and obtain approval for additional staff if needed.	3rd Quarter 1992
Begin synthesis and analyses of potential catalyst systems.	3rd Quarter 1992
Begin testing for CO conversion.	4th Quarter 1992
Test catalyst activity as a function of storage conditions and as a function of operational conditions (temperature and moisture).	4th Quarter 1992
Test active catalysts in Fact Room.	1993
Test room temperature CO catalysts in cigarettes.	1993
Test room temperature CO removal catalysts in synthetic gas stream containing CO and other gases found in cigarette smoke to test for unwanted oxidations.	1993

V. Resource Allocations	Total Person Years
Post Doctoral Research Person at Seton Hall Univ.	1 person-year
Diane Kellogg	1/4 woman-year
Arlington Finley	1/10 man-year
Chuck Hayward	1/10 man-year

FILTER TECHNOLOGY

1992 OPERATIONAL PLANS

PRODUCT DEVELOPMENT SERVICES

Responsible Individual: J. R. Hearn

I. **Objective:** Provide support services to customers in the following areas: Provide support services to customers in the following areas : New York Marketing, Domestic and International Product Development, Filter Technology, Paper Technology, Engineering Packaging Group, Flavor Technology, Packaging Group, and Semi-Works. The services provided are necessary to assist in the design and fabrication of materials, components, and machinery for the timely and efficient assessment of new and novel packaging and paper designs.

II. **Explanatory Introduction:** The members of this group are frequently called upon to provide assistance to the various functional groups mentioned above. The services and support are rendered in such a fashion that rapid evaluations are possible with considerable savings of human resources, time and money. Frequently, one-up prototypes are fabricated by hand. The major activities can be categorized as follows :

Engineering - design, fabrication, installation, testing, and maintenance of prototype equipment and machinery. Liaison with R&D Development Engineering and/or PM Central Engineering, or outside vendors.

Packaging - design, evaluation of materials and construction, and one-up prototype preparation.

Paper Converting - provide resources to prepare materials via perforation, slitting, foil mentholation, and coating.

III. **Strategies:**

- Provide and support innovative packaging concepts.
- Provide paper converting support.
- Provide machinery support.

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IV. Tactics and Timetables:

Strategy I - Provide and Support Innovative Packaging Concepts

On request from the "customer" groups listed above, we will provide a core team of engineering professionals and technicians to assess and develop novel packaging and filter designs from material, fabrication, and machinery standpoints. We will also initiate investigations/evaluations on the basis of identified strategic needs of the company.

Provide innovative packaging designs/materials on request from various "customers".	Ongoing 1992
Identify and evaluate packaging materials/ designs for desired specific properties such as degradability.	Ongoing 1992
Initiate and evaluate an injection molded "Fox Pack" of paper fibers:	
• Contact NYPRO to discuss project and appropriate mold modifications.	1st Quarter 1992
• Consult with Paper Technology on "injectable" paper formulations.	1st Quarter 1992
• Evaluate concept in modified mold.	2nd Quarter 1992

Strategy II - Provide Paper Converting Support

Paper Technology and Web Filter Development programs are supported by providing resources to convert paper products into the required configurations. Special requests for mentholated foil samples are prepared for groups such as Operations Services, Project Tomorrow, and Domestic and International Product Development.

Support Paper Technology and Web Filter Materials programs with paper converting operations.	Ongoing 1992
Provide calibration/troubleshooting services for the foil mentholator.	Ongoing 1992
Provide mentholated foil samples on request.	Ongoing 1992
Complete evaluation of the strip applicator units (both Molins and PM designs).	4th Quarter 1992

Strategy III - Machinery Support

Equipment and machinery support are routinely provided to "customers" such as Filter Technology and Paper Technology.

Support in the design, fabrication, installation, and testing of requested prototype equipment.	Ongoing 1992
Design and build a laboratory laser perforator for production of custom ventilated cigarette prototypes. The 125 watt laser is available in Semiworks for incorporation into the perforation unit. The design will be optimized with input from FTR. Both PM Engineering and Hauni Richmond will be solicited for estimates to design and fabricate this equipment.	
• Optimize existing design. Consult with FTR personnel. Visit FTR with PM Engineering designer.	1st Quarter 1992
• Obtain a cost estimate and fabrication schedule from PM Engineering.	1st Quarter 1992
• Likewise from Hauni Richmond.	1st Quarter 1992
• Initiate 650 for budget approval based on above proposals.	1st Quarter 1992
• Upon budget approval, initiate purchase order.	2nd Quarter 1992
• Issue work order to locate lab laser perforator.	2nd Quarter 1992
• Install equipment and train operators.	3rd Quarter 1992
Install the 12" wide laboratory coater in the Filter Development Laboratory.	1st Quarter 1992
Perform an electrical upgrade on the KDF-1 web filter maker to improve machine reliability:	
• Update 9/91 quotation from electrical contractor.	1st Quarter 1992
• Prepare and process 650 for budget approval.	1st Quarter 1992
• Issue work order to upgrade system.	2nd Quarter 1992

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Provide maintenance, calibration, and repair services for PDI/DDIs, PPM100s and other test equipment.	Ongoing 1992
Design, build, and install an appropriate dust collection system for the laboratory paper converting machine.	1st Quarter 1992
Upgrade the Independent Slitter in the Filter Development Laboratory.	1st Quarter 1992
Assist in providing in-house, online laser perforation capability for Parliament-type filters.	3rd Quarter 1992

V. Resource Allocations

Total Person Years

Project Personnel

A. S. Gergely
J. E. Hall
D. R. Hayes
J. R. Hearn
R. W. Newsome
G. I. Patron
J. L. Ryder
Z. R. Washington

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External Resources

PM Engineering
Semiworks Facilities Personnel
Building Administration
Paper Technology
R&D Development Engineering
Packaging Engineering
Purchasing Technical Services
Flavor Technology

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FILTER TECHNOLOGY

1992 OPERATIONAL PLANS

EXPERIMENTAL FILTER DESIGN

Responsible Individual: R. W. Newsome

FILTER TECHNOLOGY

1992 OPERATIONAL PLANS

PARLIAMENT FILTER OPTIMIZATION

Responsible Individual: J. L. Ryder

PRODUCT DEVELOPMENT SERVICES - 1992 OPERATIONAL PLANS

RESPONSIBILITY : J. R. HEARN

OBJECTIVE :

Provide support services to customers in the following areas : New York Marketing, Domestic and International Product Development, Filter Technology, Paper Technology, Engineering Packaging Group, Flavor Technology, Packaging Group, and Semi-Works. The services provided are necessary to assist in the design and fabrication of materials, components, and machinery for the timely and efficient assessment of new and novel packaging and paper designs.

EXPLANATORY INTRODUCTION :

The members of this group are frequently called upon to provide assistance to the various functional groups mentioned above. The services and support are rendered in such a fashion that rapid evaluations are possible with considerable savings of human resources, time and money. Frequently, one-up prototypes are fabricated by hand. The major activities can be categorized as follows :

Engineering - design, fabrication, installation, testing, and maintenance of prototype equipment and machinery. Liaison with R&D Development Engineering and/or PM Central Engineering, or outside vendors.

Packaging - design, evaluation of materials and construction, and one-up prototype preparation.

Paper Converting - provide resources to prepare materials via perforation, slitting, foil mentholation, and coating.

STRATEGY (1) : PROVIDE AND SUPPORT INNOVATIVE PACKAGING CONCEPTS.

Status - On request from the "customer" groups listed above, we will provide a core team of engineering professionals and technicians to assess and develop novel packaging and filter designs from material, fabrication, and machinery standpoints. We will also initiate investigations/evaluations on the basis of identified strategic needs of the company.

Tactics - Provide innovative packaging designs/materials on request from various "customers". Ongoing 1992.

- Identify and evaluate packaging materials/designs for desired specific properties such as degradability. Ongoing 1992.
- Initiate and evaluate an injection molded "Fox Pack" of paper fibers:
  * Contact NYPRO to discuss project and appropriate mold modifications. 1st Qtr. 1992.
  * Consult with Paper Technology on "injectable" paper formulations. 1st Qtr. 1992.
  * Evaluate concept in modified mold. 2nd Qtr. 1992.

I. **Objective:** Develop a method for producing a Parliament filter which may be manufactured without laser perforating on the tipper.

II. **Explanatory Introduction:** This project involves the exploration of new designs for filters with 5mm recesses which do not require laser perforation on the tipper or the use of mouthpiece paper to form a recess. An alternative would be to use uniformly pre-perforated mouthpiece paper. The finished cigarette should look similar to current Parliament. Benefits include the ability to make Parliament at speeds in excess of 8000 cpm without further high speed laser development and possible end appearance improvement. This type of filter construction would also allow higher ventilation levels with reduced variability. Achievement of this capability would potentially entail extensive design modifications to existing combiners or the Dual Hopper Max tipper.

III. **Strategies:**

- Explore combining hollow tubes with conventional filter segment enabling the use of pre-perforated tipping paper.
- Explore utilizing uniformly pre-perforated mouthpiece paper with pre-perforated tipping paper.

- Develop single wrap for a bundle of cigarettes which can be used in researching new packaging concepts :
  * Demonstrate concept. 1st Qtr. 1992.
  * Feasibility review. 2nd Qtr. 1992.

STRATEGY (2) : PAPER CONVERTING SUPPORT.

Status - Paper Technology, Web Filter Development programs, and Project Tomorrow are supported by providing resources to convert paper products into the required configurations. Special requests for mentholated foil samples are prepared for groups such as Operations Services and Domestic and International Product Development.

Tactics - Support Paper Technology and Web Filter Materials programs with paper converting operations. Ongoing 1992.
- Provide calibration/troubleshooting services for the foil mentholator. Ongoing 1992.
- Provide mentholated foil samples on request. Ongoing 1992.
- Complete evaluation of the strip applicator units (both Molins and PM designs). 4th Qtr. 1992.

STRATEGY (3) : MACHINERY SUPPORT.

Status - Equipment and machinery support are routinely provided to "customers" such as Filter Technology and Paper Technology.

Tactics - Support in the design, fabrication, installation, and testing of requested prototype equipment. Ongoing 1992.
- Design and build a laboratory laser perforator for production of custom ventilated cigarette prototypes. The 125 watt laser is available in Semi-Works for incorporation into the perforation unit. The design will be optimized with input from FTR. Both PM Engineering and Hauni Richmond will be solicited for estimates to design and fabricate this equipment.
  * Optimize existing design. Consult with FTR personnel. Visit FTR with PM Engineering designer. 1st Qtr. 1992.
  * Obtain a cost estimate and fabrication schedule from PM Engineering. 1st Qtr. 1992.
  * Likewise from Hauni Richmond. 1st Qtr. 1992.
  * Initiate 650 for budget approval based on above proposals.
  * Upon budget approval, initiate purchase order. 2nd Qtr. 1992.
  * Issue work order to locate lab laser perforator. 2nd Qtr. 1992.
  * Install equipment and train operators. 3rd Qtr. 1992.
- Install the 12" wide laboratory coater in the Filter Development Laboratory. 1st Qtr. 1992.
- Perform an electrical upgrade on the KDF-1 web filter maker to improve machine reliability :

    * Update 9/91 quotation from electrical contractor. 1st Qtr. 1992.
    * Prepare and process 650 for budget approval. 1st Qtr. 1992.
    * Issue work order to upgrade system. 2nd Qtr. 1992.
- Provide maintenance, calibration, and repair services for PDI/DDIs, PPM100s and other test equipment. Ongoing 1992.
- Design, build, and install an appropriate dust collection system for the laboratory paper converting machine. 1st Qtr. 1992.
- Upgrade the Independent Slitter in the Filter Development Laboratory. 1st Qtr. 1992.
- Assist in providing in-house, online laser perforation capability for Parliament-type filters. 3rd Qtr. 1992.

RESOURCE ALLOCATIONS :

Project personnel :

A. S. Gergely, J. E. Hall, D. R. Hayes, J. R. Hearn, R. W. Newsome, G. I. Patron, J. L. Ryder, Z. R. Washington

Total person-years : 5

External Resources :

PM Engineering, Semi-Works Facilities personnel, Building Administration, Paper Technology, R&D Development Engineering, Packaging Engineering, Purchasing Technical Services, Flavor Technology

IV. Tactics and Timetables:

Strategy I - Develop a method for producing a Parliament filter segment enabling the use of pre-perforated tipping paper

Several trials have been run with various tube materials using different combining operations. These tests have served to identify deficiencies in tube construction materials and appropriate size considerations in the tubes. Information regarding the processing of the tubes in the various types of combining operations has also provided insight into the machine design modifications necessary to implement this concept.

Obtain different types of tube for evaluation on combining equipment.	1st Quarter 1992
Form a 5mm recess by combining a tube with a conventional component by offsetting an existing combiner cutterhead (and wasting half the cigarettes produced from these filters).	1st Quarter 1992
Evaluate cigarettes for aesthetics and functionality of filter recess.	2nd Quarter 1992
Recommend design modifications for combiner(s).	2nd Quarter 1992

Strategy II - Explore utilizing uniformly pre-perforated mouthpiece paper with pre-perforated tipping paper

This approach has not previously been investigated.

Investigate means to obtain uniformly perforated Parliament mouthpiece paper. Consult with vendors and perform tests with in-house perforating machinery.	2nd Quarter 1992
Make cigarettes using pre-perforated mouthpiece and tipping papers. Ventilation variability and achievable range of ventilation should be consistent with brands utilizing porous plug wrap.	2nd Quarter 1992
If papers other than conventional mouthpiece paper are necessary to produce a pre-perforated paper, then a "Parliament style" combiner will need to be obtained for Semiworks.	2nd Quarter 1992
Produce a subjectively and cosmetically acceptable Parliament with the appropriate ventilation levels and variability.	3rd Quarter 1992

V. Resource Allocations

Total Person Years

Project Personnel

J. E. Hall
J. L. Ryder
Z. R. Washington

External Resources

Semiworks
Central Engineering
Stockton Street Factory
Flavor Technology

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Strategy IV - Evaluate DHS

DHS has assembled a proposal for a unitized or mini-tow production facility. Their engineering package is currently under evaluation by PM Europe personnel. A production facility like this would reduce PM's dependence on the current vendors and potentially allow us the latitude to investigate novel filter flavors, additives, and shapes.

Confer with PM Europe personnel on the feasibility of DHS to construct a tow manufacturing facility of this scale.	1st Quarter 1992
Request samples of filter tow for evaluation.	2nd Quarter 1992

Strategy V - Evaluate Ultra Low Denier Per Filament (DPF) tow items

Evaluate ultra-low dpf tow items as they become available.	Ongoing 1992

Strategy VI - Evaluate novel vendor filters

Evaluate materials as they become available.	Ongoing 1992

Strategy VII - Investigate/evaluate degradable filter materials

Search for degradable filter materials and evaluate as they become available.	Ongoing 1992

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V. Resource Allocations

Total Person Years

Project Personnel

A. S. Gergely	
J. E. Hall	
D. E. Laslie	
R. W. Newsome	
G. I. Patron	
J. L. Ryder	
Z. R. Washington	1

External Resources

PM Engineering
PM Europe
Semiworks
R&D Development Engineering
Building Administration
Paper Technology

I. **Objective:** Design, evaluate, and develop new filter concepts that provide improved subjective benefits to our consumers.

II. **Explanatory Introduction:** The scope of this activity is to investigate, design, evaluate, and develop new and novel filter materials and constructions. To achieve this goal it will also be necessary to assess fabrication techniques, equipment, and machinery. This is especially important if we are to reduce the current dependence we have on American Filtrona Co. (AFC) to produce paper core concentric (PCC) filters for us. Plugmaking machinery assessment/development will allow the development of new materials/concepts to proceed without disclosure externally. In addition, turn around times for samples could be significantly reduced, thus increasing PM's control over test schedules.

III. **Strategies:**

- Develop the capability to manufacture PCC filters in-house.
- Conduct joint development of heterofil filter materials with Celanese.
- Investigate CA tow made with reduced bleach or unbleached cellulose.
- Evaluate DHS.
- Evaluate Ultra Low Denier Per Filament (DPF) tow items.
- Evaluate novel vendor filters.
- Investigate/evaluate degradable filter materials.